The Iron Age

A Review of the Hardware and Metal Trades.

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The Haskins Steam Engine.

American machinery has familiarized the world with a *good watch*, at a low price, and all because the parts are made by special devices in immense quantities, so that any portion of a watch can be produced by thousands—infinitely better than the hand-made watches of England and Europe, at a moiety of the price formerly charged, of necessity. The same is true of sewing machines, locks, and numerous other light manufactures. Not until recently, however, within three years, has the system been applied to the manufacture of steam engines, for it was considered by mechanics as altogether too expensive to prepare the needed appliances, as the outlay could not be remunerative—owing to the limited demand for engines—the great competition, and consequent low prices.

The Haskins Machine Company, of Fitchburg, Mass., and No. 46 Cortlandt street, New York city, fitted their establishment entirely on this plan, some years since, giving up all branches of the machine business, that they might turn their entire attention to the manufacture of a good vertical steam engine. So far have they carried the system, that no single part of their engines are made by measurement in feet and inches, but each and every piece is passed through, or is fitted to a gauge; every hole, from holding down bolt holes to the smallest set screw hole, is drilled through a steel hardened "gig," so that any given piece may be made in any quantity with the positive assurance that each will go to the designed place without any hand labor being necessary to fit it, thus ensuring the desired "complete whole," made up of correct parts.

Having made the parts to make an engine, it only requires the putting together of these parts, and this is rapidly and correctly done per force; for as each integral portion has been correctly made, their union ensures the same perfection.

Having got the engine together, it is then placed on the testing platform, where steam is applied, and, by the aid of the "friction brake" and the "indicator," its exact condition determined, and being determined, a warrant of efficiency can be given accordingly. Every engine this company manufactures and sells goes through this process, so that the standard of efficiency attained is a matter of necessity and uniformity, not chance.

It is claimed, also, for this engine—and the claim is well substantiated—that, aside from this perfect system of manufacture, it has many points of excellence. One of these points is claimed to be its general outline. It will be noticed that all strains are met by straight lines, rather than curved ones, which are regarded as elements of weakness. The valves used on these engines are the "piston valves" of Thomas S. Davis, long the superintendent and manager of the Jersey City Locomotive Works—which, though first constructed and patented some ten years since, have stood the test of time thoroughly and successfully.

On small engines, unless specially ordered otherwise, the valves are made to cut off at a point pre-determined; on others, an automatic "cut-off," controlled by the governor, is applied, insuring efficiency equal to the best.

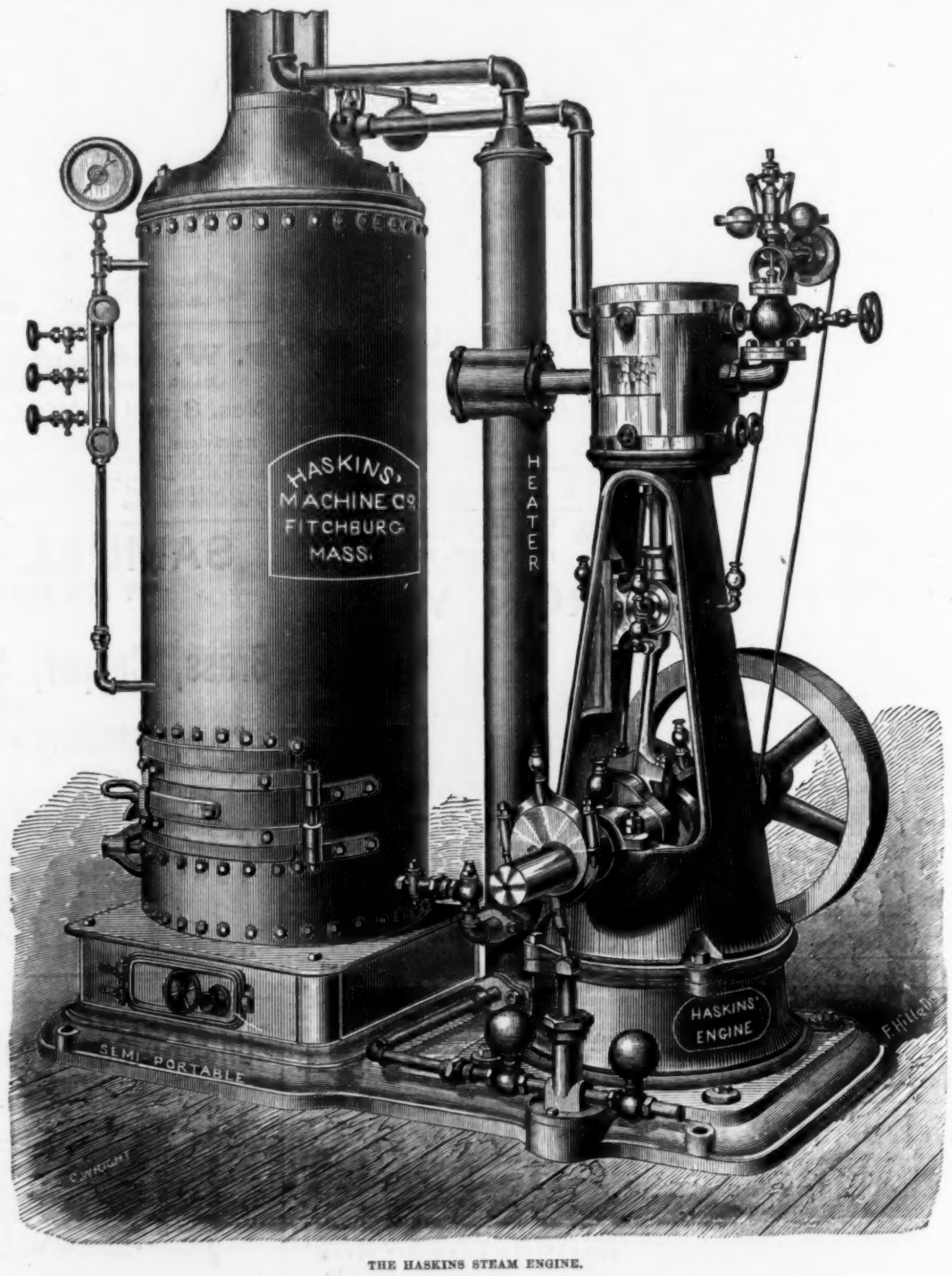
For driving the valve the usual eccentric is made use of, with the exception of its mode of construction and adaptation to this particular engine. It is made fast on the shaft, permanently, not with set screws or keys, but is made an integral portion of the shaft, and then, on its periphery is "shrunk" a reinforcing ring, which is hardened, and can be replaced in case of accident to its surface. No place is left for any adjustment of valve motion. Every part is made the exact length desired, and pinned fast. No screw or nut can be changed to alter the desired results. Thus is the perfection sought permanently secured; for, so soon as a change is allowed in the valve motion of an engine, just so soon are the results of the original engineering skill lost. The main shaft, the connecting rod, and all other boxes, are composition, lined with best Babbit metal, and are made interchangeable. Their wear does not, therefore, affect the framing or lining of the engine. The connecting rod and its pins are very large at the bearing points. The cross head is provided with adjustable composition gibs of very large surface, and self centering. The piston rods, and all the parts which require it, are of the best steel.

A neat and efficient plan of getting rid of drip water from the cylinder, is peculiar to this engine. The device is contained beneath the jacket—when in use the drip water passes down inside the post, and out of the base—and it can thus be carried off to the sewer, without in the least soiling the floor.

The engine shown is of the class known as semi-portable, of 10 horse power, being so arranged as to make it transportable and efficient in all positions. This class of engine is often put on wooden floors, and when so placed is considered by the insurance people so safe that "no extra insurance" is charged.

None of these engines are attached to boilers, as portables are made. One engine should outwear at least three boilers, and when attached, the engine naturally gives out when the boiler does.

While we show only a semi-portable engine, the Haskins Machine Co. make, by the same process, and of the same excellence, engines up to 100 horse-power, with and without cut offs and boilers.



THE HASKINS STEAM ENGINE.

Sonorous Sand.

A specimen of this curious substance, taken from a bank on the island of Kauai, of the Hawaiian group, was presented by W. R. Frink, of Honolulu, to the California Academy of Sciences at the last meeting. The following interesting description of its peculiarity was contained in a letter from the donor: The bank, which is composed of this sand, commences at a perpendicular bluff at the southwest end of the island, and extends one and a half miles almost due south, parallel with the beach, which is about 100 yards distant from the base of the sand bank. This sand drift is about 60 feet high, and at the extreme south end the angle preserved is as steep as the nature of the sand will permit. The bank is constantly extending to the south. It is said by the natives that at the bluff and along the middle of the bank the sand is not sonorous. But at the extreme south end and for half a mile north if you slap two handfuls together there is a sound produced like the low hooting of an owl—more or less sharp, according as the motion is quick or slow. Sit down upon the sand and give one hand a quick circular motion, and the sound is like the heavy bass of a melodeon. Kneel upon the steep incline, extend the two hands and clasp as much sand as possible, slide rapidly down, carrying all the sand you can, and the sound accumulates as you descend until it is like distant thunder. In this experiment the sound was sufficient to frighten our horses, fastened a short distance from the base of the drift.

But the greatest sound we produced was by having one native lie upon his belly and another taking him by the feet and dragging him rapidly down the incline, carrying as much sand as possible with them. With this experiment the sound was terrific, and could have been heard many hundred yards distant. With all the experiments that were made, it seemed the sound was in proportion to the amount of sand put in motion with proportionate velocity. Another consideration seems requisite—that is, its perfect dryness. The dry sand would sound on the surface, where six inches beneath it was wet; but if any of the wet sand became mingled with the dry, it property of sounding ceased at once. The sand appears to the eye like ordinary beach sand, but ordinary beach sand will not produce the sounds. It has been said that it lost its sonorous properties when taken away from the bank. But I can discover no diminishing of its sonorous qualities, even with the bottle uncorked, and we have had rain frequently, and an atmosphere more than ordinarily moist for this time of year. Perhaps, if exposed to a very damp atmosphere, it might absorb moisture enough to prevent its sounding.

How Dwellings are Warmed in China.

During the past two or three months considerable discussion has been going on in English and German journals about the making of a new artificial fuel from a combination of coal dust and stable manure, but it appears that this idea was known centuries ago to the Chinese, who have anticipated so many modern inventions. The Chinese, to prevent their flues from being choked by soot, employ instead of coal of good quality, inferior or refuse coal for this purpose, and mix it with a compost of clay, earth, cow dung, or any refuse matter, which they form into balls and dry in the sun or open air. They do not adopt this method on account of a scarcity of fuel, for coal is abundant in China, but they know how to economize it. These fire balls give out in burning very little smoke, and are extensively manufactured in the coal districts, and distributed by canal carriage over a large portion of the empire.

In the inferior class of houses, instead of having the fire outside the house or room to be heated, as in the better class, their stoves are built in a corner of the dwelling room. A pit is dug for the body of the fire chamber and draught hole. That no portion of the heat may be lost, or escape into the room directly from the fire, vessels of water are placed on the head of the stove, and in this manner the heat is absorbed and economized at the same time, affording, by evaporation, the necessary supply of moisture to preserve the atmosphere of the room in a healthy condition. The Chinese call a stove *kang*; the *ti-kang* is a furnace, of which the flue runs under the floor or pavement of a room; and the *kao-kang* is that used for heating benches and beds. There is yet a third variety, the *tong-kang*, which is formed in the wall, differing from the ti-kang only in being perpendicular instead of horizontal. In the tong-kang the heating flue is carried along the floor, with openings from it, through which the heated air and smoke ascend into the spaces of a hollow wall, thus nearly approaching the principle of the chimney. A tong-kang was erected by Sir William Chambers, in 1761, for heating the orangery at Kew Palace. In imitation of the Chinese method, he introduced heated air through an air pipe or flue in contact with the heating flues. It is scarcely possible to improve upon these refinements of the Chinese, except by the introduction of the chimney.

A Coal Feeder for Puddling Furnaces.

Mr. Samuel Danks, whose name is well known in connection with his rotary puddling machine, has brought out a useful novelty in the shape of a mechanical coal feeder, which has been successfully tried in several establishments with very satisfactory results. The principle of the invention is as follows: The coal, which may be of a small, inferior kind, is put into a large trough, at the bottom of which are three screws, employed to push the fuel into the furnace, which screws can be worked by an excentric from the machinery or by a wire rope. The small coal, which is little better than the dust, when first driven in, is quickly turned into a large cake of coke, and as the screws keep working, this is pushed further into the body of the furnace, during which operation it is split into pieces, while the gases as they are driven through this cracked coke from the half consumed coal are ignited, and produce a very intense heat. The gases are thus thoroughly utilized, indeed, it is seldom that any smoke is seen to issue from the chimneys. The principal advantages claimed for the invention are—1st. That a great saving is effected in the consumption of fuel, for smaller and cheaper coal can be used than if the boilers or furnaces are fired in the ordinary way; 2d. That a more intense heat is produced; 3d. That very little labor is required; 4th. That, as the fire place can be built of bricks outside the boiler, the whole boiler is made into heating surface. When applied to puddling furnaces its merits are still further shown, seeing that not only is the yield of iron increased, but the quality is also considerably improved, this being attributable to the fact that when firing no door is opened to allow the admission of cold air into the furnace. The machine is under perfect control, and the rate at which the coal is supplied to the furnace can be either slackened or increased at will.

The Electrical Phenomena of Steam.

BETHLEHEM, Pa., July 31, 1874.

To the Editor of The Iron Age—SIR: In your issue of the 30th ult. you copy an article from a Virginia (Nev.) paper, headed "A Curious Electrical Phenomenon," as follows:

During the past three nights the engineers and machinists at the round house of the Virginia and Truckee Railroad Company, in this city, have been in a state of lively excitement about some strange electrical disturbances which have occurred there every night. For three nights all hands have been engaged in trying to solve the mystery, but have only partially succeeded. The company erected a large smoke stack, which rises to a considerable hight above the roof of the round house. At the base this smoke stack is spread out in the shape of a funnel. It was built in order that the locomotives may stand under it and cool off when they came in off of the road, and also while being fired up in the morning. Into the side of this smoke stack, three or four days ago, was run a stove pipe from a stove standing in a room about 40 feet distant. It is about this stove that the electrical disturbances take place.

The first that was observed of these was about 11 o'clock, four nights since, when P. Pippingham, a well-known machinist, approached the stove for the purpose of putting a stick of wood into it. As the stick neared the stove he received such a shock that it fell from his hand, and his arm was benumbed. He at first thought he had taken a sudden cramp in his arm. In trying again to put the wood into the stove he received a second shock. This time he perceived a flash and heard a sharp snap, which he at once recognized as a discharge of electricity. They tried all manner of experiments, and found that the stove was fully and heavily charged with electricity, it giving out sparks and flashes when a piece of iron, steel, wood, or the naked hand approached it.

After an hour or two the phenomenon ceased. The next day nothing was seen of it, but the next night, about 11 o'clock, shortly after a locomotive came in and stopped under the funnel of the smoke stack, the stove was again charged, and began snapping and cracking, sending out sparks and flashes on all sides. So it has been every night since.

I would explain this phenomenon as follows:

The vapor of escaping steam is highly, negatively electrical. This can readily be shown, on a small scale, by insulating a small boiler and allowing steam to escape therefrom. If a conducting wire, one end terminating in a number of points, be placed so that the points are presented to the vapor, and the other end to connect with the earth, a strong current of electricity will be conducted from the earth to the vapor. A break in the wire will show it by a spark.

My theory is, that steam and electricity, in a measure, hold to each other the relations as a sponge and water. Steam in the boiler is the sponge with the water nearly all pressed out, or, as the bulk of the steam; when the steam is escaping it is as the sponge set free, taking up all within reach, the vapor attracting electricity as the sponge does water.

If, as it seems, it is true that vapor requires electricity in proportion as its bulk, in order to keep in equilibrio with surroundings, then it is quite evident why it should be so strongly, negatively electrical. The smoke stack mentioned is virtually insulated, and the vapor from the steam renders it negatively electrical. The stove pipe becomes a conductor from the stove, which, no doubt, is also nearly insulated. It then follows that the stove is in the same condition as the smoke stack, and will take electricity from, not give to, every object that approaches. I do not think that the phenomenon will occur unless steam first escapes into the smoke stack.

D. S.

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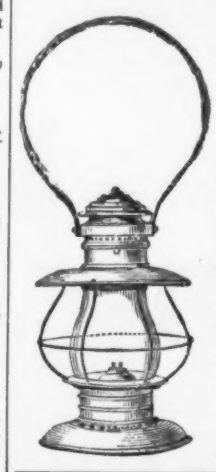

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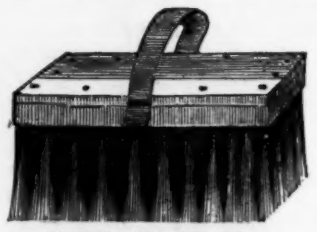

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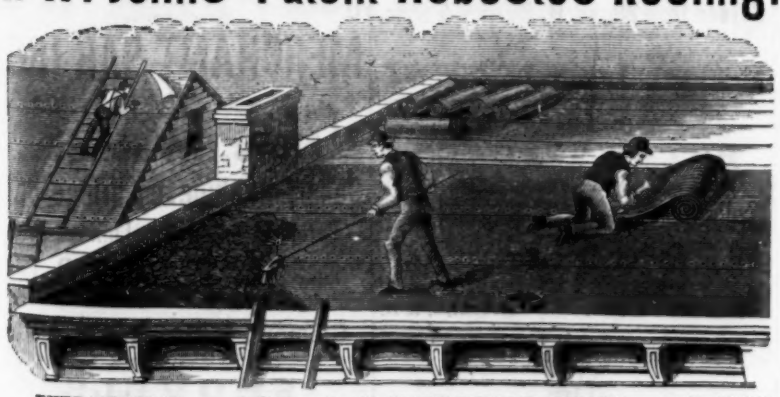

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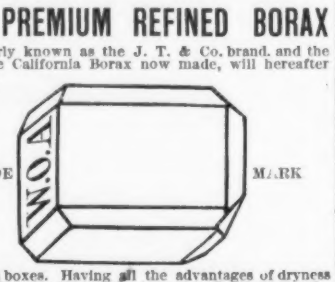

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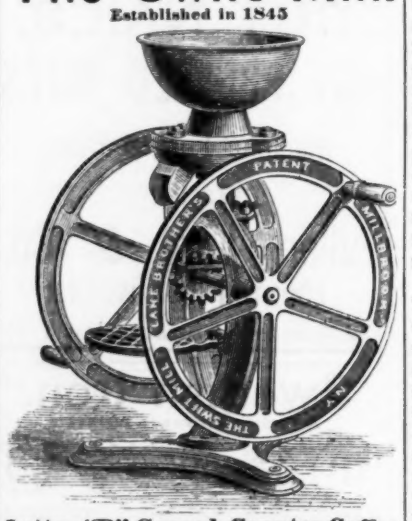

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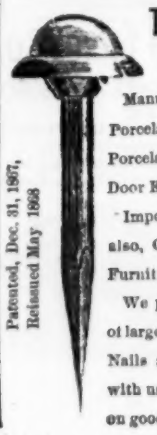

Patented, Dec. 31, 1867, Released May 1868

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We particularly invite the attention of large buyers to our Patent Picture Nails and Knobs being a specialty with us, we offer satisfactory discounts on good orders.

Sword Manufacture in Birmingham.

On Easter Monday, April 3, 1643, Prince Rupert assaulted, sacked and burned the town of Birmingham in the cause of King Charles I. Two days afterward a brief account of this proof of Rupert's burning love to England was given in a letter written from Walsall, by a worthy gentleman to his friend in Oxford, concerning Birmingham. This is dated April 5, 1643, and the writer says: "I find that the inhabitants of that towne were they who first stirred up those of Coventry to resist the king, and that about 300 from thence went into Coventry to defend it against the king's forces, that from thence they sent 15,000 swords for the Earl of Essex his forces, and the ayd of that party, and not only refused to supply the king's forces with swords for their money, but imprisoned divers who bought swords, upon suspicion that they intended to supply the king's forces with them." This passage proves that for at least 230 years Birmingham has been famous for sword making, and that the reputation which the town still possesses for excellence in this manufacture is of a venerably ancient date. It is also equally clear, from the above passage, that the early sword makers were strongly Parliamentarian, and so zealous was their patriotism that they even forgot their trade interests to the extent of actually refusing to sell swords to the Royalists. The principal sword maker of that exciting time was Mr. R. Porter, who suffered for his political zeal by the loss of his mill. In a letter on the subject, written by himself, he says: "For pillage but of little I lost, having removed the things I had of any value; and for fire, God did marvellously prevent both to me and many others, whereat the malignants are so enraged that they have since pulled down my mill, and pretend that Prince Rupert so commanded, and threaten to pull down my house and divers others, which I think they dare not, lest they build it up againe, the country having sent them admonition of their insolency." This is also confirmed by another tract on the sacking of the town, which has an enormously long title, but is popularly known by a part of its first sentence, as "Prince Rupert's burning love to England discerned in Birmingham's flames." Describing what had taken place after the burning of the town, the writer says: "Likewise they have caused one Mr. Porter's blade mill in the town to be pulled down, wherein sword blades were made, and imployed only in the service of the Parliament, and so they were informed (which cost erecting about £100), threatening if it were not pulled downe, the rest of the towne should be burnt. For now they begin to be great agents in fire-workes."

The manufacture of swords is one requiring great skill in all its departments. Success in this work depends upon the acquired skill, the long experience, the educated eye, and the manipulative power, which seem to require many generations of workmen before they are attained in their higher excellence. The slightest mistake in working would make a sword blade useless, and this applies to each of the three great processes through which it has to pass—forging, tempering and grinding. From the necessity of all the work being skilled work, each part of a sword—the blade, the grip, the hilt, the scabbard—is made by hand, and the witnessing of the manufacture is thereby rendered especially interesting.

The first process is the forging of the blade. The steel comes from Sheffield in double molds, the length of two blades as it is called, and is of the best steel, and is in strips, each strip being the length of two swords. The workman takes the strip and first breaks or cuts it across the middle. The handle end of the blade is of iron, as this metal bears more knocking about and can be used in a manner that would be fatal to steel. The iron end is then put in the fire, and the "tang," or part to fit into the hilt, is forged. The blade is then passed through the fire a large number of times, and beaten out on the anvil in order to distribute the metal equally in every part. At the same time the furrow is worked up the center of the blade, wide or narrow according to the pattern and size required. In those known as Scotch blades two furrows are beaten. This is a work requiring great care and skill. The future worth of the blade depends upon the skill of the forger. The slightest defect or inequality in the distribution of the metal makes the blade to that extent imperfect. With a skillful workman this is, of course, of rare occurrence. He knows precisely the amount of hammering required. It may be noted here that every blade passes through the fire no fewer than twenty-five times before it is completely forged.

After forging follows the most delicate and important part in making a sword blade—tempering. The object of tempering being, of course, to give the steel the required elasticity. It must not be too hard or it will break, and it must not be too soft or it will bend; but must be so equally tempered that when its point is pressed on the ground the blade will, when free, at once take its natural shape, without hurt or detriment in the slightest degree. The mode by which this great, this necessary quality is secured, is as simple as it is effective. Before the blade can be tempered it must be made extremely hard: this is done by first passing it through the fire, and then while hot it is plunged into water. The first plunge hardens the blade to such extreme hardness that it is as brittle as glass, and if thrown down would break into pieces. Again it is passed through the fire and then beaten straight, for the effect of the action of the water on the hot metal is to make it of all shapes. Just at the point at which the blade takes a particular color, known at once to the practiced eye, it is again plunged into the water, which, in technical language, "prevents its going down lower," and is tempered. It can now be bent backward and forward without any fear of its breaking, and is ready for the grinder.

The grinding is done on the best Leeds stones, the blade being placed in a frame of wood, and its surface pressed on the stone until the work is done. This also depends upon the skill and the eye of the workman. In grinding the furrows, a stone of peculiar construction is used. The face is cut into raised flutings of the size and shape of the furrows of different swords, and on these the blade is pressed, and the furrow effectually ground. This is called the hollowing stone. Each blade takes from an hour and a half to two or three hours grinding, according to its quality.

The blade is now ready for polishing. This is done on lathes worked by steam. Different sized wheels are fitted on the spindle, and lard oil and double washed emery are used in the operation. The blade is often put into lime dust during the process, and on the lathe brush used a crocus dust of deep purple tint, and ground very fine, is thrown over the brush, and a most brilliant polish is the result. Scabbards and hilts, and other ornamental parts of the sword are also polished in much the same manner. In the case of scabbards a larger wheel is used instead of the ordinary lathe brushes. When polished the blade is ready for the hilt and scabbard; so we will now see how these are made. And first for the scabbard.

In making a scabbard the workman takes a piece of flat steel cut to the required size. He first places it on the top of an open vice, and beats it with a wedge shaped wooden mallet, bringing the two edges closer together each time it passes along the vice. It is then beaten on both sides until they almost meet; a mandrel is then put down it, and the steel beaten close round the mandrel, both edges being hammered over. The edges are then soldered. It is next beaten on an anvil all round, the mandrel is withdrawn, and the scabbard is ready for the "drag," which is a piece of iron fitted to, and fastened on, the bottom of the scabbard. The "bands" are then put on, and the scabbard, after being filed and smoothed, is ready to be polished.

The making of the "grips" is also a very interesting bit of work. These are the handles by which the sword is gripped, hence the name. A "grip" at first is a bit of walnut, oblong in shape, but narrower at the end than the top. The back, which is made of metal, is placed on it, and the wood is worked into the required shape by files. A large number, of different shapes, sizes, and cutting power are used in this work. When the top has been cut, the grip shaped, and the tenant for the ferril made, it is then "balled." For this purpose it is fastened in a vice, a three-sided file cuts a deep indention at regular intervals, each division is rounded or "balled" by a file, and the indentions connected by slanting interstices cut by a hand saw. The grip is then drilled through in a lathe, for the purpose of receiving the "tang." When this has been done, a piece of the skin of a dog fish, which has been a long time soaked in water, is cut off. Every bit of flesh on the inside of the skin is then carefully cut off, and a piece of pure skin is left. This is put round the grip, a piece of string or wire is fixed by a loop to a piece of steel fastened in the vice, and the workman binds the skin tightly round the grip by winding the string or wire round the space between each ball. It is then filed and the back fitted on again. In making a grip it passes through the workman's hands no fewer than thirteen times.

Another operation is the dressing the hilts. A hilt is at first a flat bit of metal of a peculiar shape, and may be cut to any pattern. A large number of these are used which are all made to a regulation size. The pattern used is placed on the metal which is then marked. They are then filed and cut by hand, beaten on blocks and knobs into the shape of the ground, and afterward polished, and made ready to be fixed to the sword.

This is called mounting. In the cheaper swords the blade is bought from one person, the hilt from another, the scabbard from a third, and so on. But in this manufactory every part is made in the works, and each piece is prepared to suit and fit for the other parts, so that when fitted together the sword is firm and sound, and the parts never give way or become loose, as they do when stuck on to the tang of a blade without any reference to their weight or suitability for each other and the blade to which they are attached. In such cases the parts with little wear become loose and rickety, and depend only upon the small rivet at the top for their security. In ordinary swords the blades and hilts, after having been ground, filed and polished, are taken into the mounting shop. There the "tang" is placed in the "grip." The hilt is fastened on by passing a rivet into the top of the grip, and fastening it to the tang. The hilt is drawn over this rivet, which passes through a hole at the top. It is then filed and broken off at a short distance from the hilt. The rivet is then welted by being filed, and smoothed until it has the appearance of an ornamental knob, forming an integral part of the hilt. These swords are now complete. In the mounting of best work great care and skill are required. In the mounting shop a very ingenious tool is used, called a "float." It is a long bit of steel, shaped almost like a tang, with a series of blades along its surface. The "grip" is worked to and fro on the float until it is cut to the exact size and shape of the tang on which it is to be fixed. Great skill is required in this delicate operation. In this mounting room the swords are "proved." This is done by placing the point of the blade on the floor, and bending it backward and forward. After it has stood this test, it is subject to another. The workman strikes the blade strongly on a wooden block, both on the edge and back, and can tell by the ring whether it is of true perfect quality. By these tests the slightest fault or flaw would be detected, for a very small fault, indeed, would cause the blade to break.

The scabbards are lined. In the ordinary sword two thin strips of wood of the shape of the scabbard are placed on either side, and they must fit so accurately that neither in drawing nor in sheathing the sword must the slightest obstruction be perceptible. In the better swords leather is used in lining.

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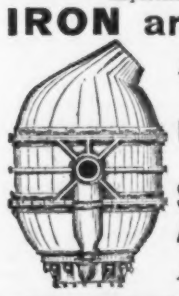

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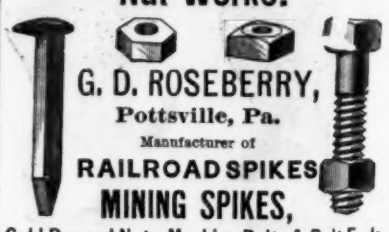

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New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

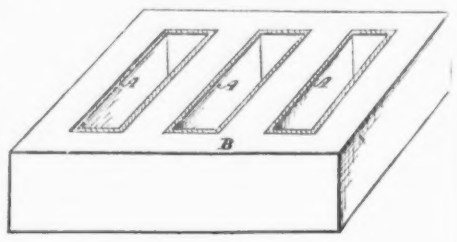
IMPROVEMENT IN THE MANUFACTURE OF IRON AND STEEL.

Specification forming part of Letters Patent No. 152,326, dated June 23, 1874, issued to William Bushnell, New York:

This invention relates to that class of processes in the manufacture of iron and steel wherein iron ores and other oxygen bearing substances are used as decarbonizing agents, and for converting crude iron into wrought iron and into steel, and is, in some respects, similar to the plan and process described in specification filed in the Patent Office January 14, 1874, and for which Letters Patent have been granted.

In that specification are described certain iron vessels and molds lined with wood, in which are commingled and mixed together molten crude iron and granulated or pulverized iron ore for the purpose of decarbonizing and converting such crude iron into wrought iron and into steel. In this invention iron vessels are not used at all, but simply wooden boxes or molds embedded in sand, clay, or other earthy material, and in such boxes or molds so embedded are mixed together granulated or pulverized iron ore or other decarbonizing substance and molten crude iron direct from a blast furnace hearth, or remelted pig iron from a cupola furnace.

The drawing represents three wooden boxes, letters A, A, A, sixteen inches long, six inches wide, and twelve inches deep, embedded in sand, letter B, to their upper edges. These boxes, for convenience of description, I call "ingot molds."



IMPROVED INGOT MOLDS.

These ingot molds may be made of boards of any desired thickness, and may be made of any size, form, or shape required to meet general or special cases, the form and size represented in the drawing being given simply to suggest a weight of iron convenient for handling, reheating and rolling. The aim and object of using wooden ingot molds are to maintain, or to assist in maintaining, the temperature of the molten crude iron while it is acting upon, reducing, and deoxidizing the iron ore commingled with it, and consequently to facilitate the decarbonization and conversion of the crude iron into wrought iron and into steel.

In carrying out this process in a blast furnace, prepare a sufficient number of the wooden ingot molds to receive and contain the quantity of molten crude iron proposed to be drawn from the furnace hearth at a given time, and embed them in sand, loam, or clay, as near to the hearth as convenient, and then, at the proper time, draw the liquid iron from the hearth directly into the molds, charging one at a time in regular succession as the stream of iron reaches them, and at the same moment introducing and mixing with the iron in the molds such quantity of pulverized or granulated iron ore or other decarbonizing substance as may be necessary to convert the crude iron into wrought iron or into steel. In sinking or embedding the ingot molds in sand, loam, or other earthy substance, for the above purpose, care must be taken to have a sufficient quantity of such substance well rammed between and around them to withstand the pressure of the iron in case the molds burn away before the iron chills.

In a cupola furnace, using remelted pig iron, embed or sink the wooden ingot molds in sand, loam, or other earthy material, upon the furnace floor, in same manner above described, and run the liquid iron directly into them by means of a wooden-lined gutter or spout, or convey it to them in iron ladles lined with wood; or, in case it is desired to draw the molten iron directly from the cupola spout or outlet into the molds, use a car or truck having upon it a sheet or plate iron body or box of sufficient dimensions to hold and contain the desired number of the wooden ingot molds, properly embedded in sand or loam, and so arrange the car or truck upon a track that the molds it contains may be brought under the spout or outlet of the cupola for receiving the charge of liquid iron, and at same time receive the proper proportion and mixture of granulated or pulverized iron ore, or other oxygen-bearing or decarbonizing substance, for the purpose hereinbefore set forth.

In order to protect the surface of the molten iron from the atmosphere while it is in its liquid state in the molds, make the molds a few inches deeper than is requisite to contain the charge of iron, thereby causing the flame arising from the burning of the wood to converge over and envelop the surface of the iron while the process is going on.

Claim.—1. The wooden boxes or ingot molds embedded in sand, loam, clay or other earthy substances, upon the floor or in the pig-bed of a blast furnace.

2. Wooden boxes or ingot molds embedded in sand, loam, clay or other earthy material, within the body or box of a car or truck.

IMPROVEMENT IN SURFACING SHEET IRON TO RESEMBLE RUSSIA IRON.

Specification forming part of Letters Patent No. 152,814, dated July 7, 1874, issued to John Stackhouse, of Allegheny, Pa.

This invention relates to a new and useful improvement in the manufacture of sheet iron; and consists of the use of a solution of oxalic acid, or other substance, and water or other liquid, during the rolling of the iron, at or previous to the last rolling.

The sheets of ordinary iron of good quality are placed in "packs" of four sheets, more or less, in a pack, and, previous to heating for the last rolling, immerse the pack in a solution of oxalic acid and water, about one part of the oxalic acid and about nine parts, by weight, of water being used to form the bath. When the iron is heated, the water, of course, evaporates, leaving a slight film on the surface of each sheet of iron, which is converted into carbonic acid gas. This gas combines with the iron, and hardens the surface.

There are other substances which will have the same or a similar effect; but, with oxalic acid, carbonic acid is formed without leaving any residuum or foreign matter. The surface of the iron is, consequently, left clean, and takes a high polish when the sheets are rolled, the iron resembling the best quality of Russia sheet iron.

After the sheets are rolled they are annealed in suitable air-tight vessels, which renders the iron soft and malleable.

The bath may be composed of any other substance that will dissolve in water, and produce carbonic acid when the water evaporates, and leave no residuum when thus converted. Other liquids than water may be used to dissolve such substances for forming the bath.

Claim.—The above described process for manufacturing sheet iron to resemble Russia sheet iron.

Dr. Franklin as an Inventor of Stoves.

Among the many things essayed by Benjamin Franklin for the benefit of his fellow-men, few were more immediately and permanently useful than his inventions and improvements in fuel-saving stoves, and his devices for the curing of smoky chimneys. Franklin saw that the stove was a great civilizer; that when fuel was dear people lived miserably, but that when it was cheap and well managed they lived comfortably. In 1745 Franklin invented a fire-place, which he named the Pennsylvanian, in which he ingeniously combined Prince Rupert's descending flue (a contrivance by which the draught took a downward direction before entering the chimney), and Guager's hollow back jambs and hearth, called caliducts. This invention was described in a pamphlet written and printed by Franklin himself. The following is a copy of the title page: "An account of the new invented Pennsylvanian fire-places; wherein their construction and manner of operation is particularly explained; their advantages above every other method of warming rooms demonstrated; and all objections that have been raised against the use of them answered and obviated. With directions for putting them up, and for the using them to the best advantage. And a copper-plate in which the several parts of the machine are exactly laid down from a scale of equal parts. Philadelphia: printed and sold by B. Franklin, 1744."

The following is from Franklin's Autobiography: "Having, in 1742, invented an open stove for the better warming of rooms, and at the same time saving fuel as the fresh air admitted was warmed in entering, I made a present of the model to Mr. Robert Grace, one of my early friends, who, having an iron furnace, found the casting of the plates for these stoves a profitable thing, as they were growing in demand. To promote that demand I wrote and published a pamphlet, entitled, 'An Account of the new invented Pennsylvanian fire-places, etc.' This pamphlet had a good effect. Governor Thomas was so pleased with the construction of this stove, as described in it, that he offered to give me a patent for the sole vending of them for a term of years; but I declined it from a principle, which has ever weighed with me on such occasions, viz., 'That as we enjoy great advantage from the invention of others, we should be glad of an opportunity to serve others by an invention of ours; and this we should do freely and generously.'

"An ironmonger in London, however, assuming a good deal of my pamphlet, and working it up into his own, and making some small changes in the machine, which rather hurt its operation, got a patent for it there, and made, as I was told, a little fortune by it. The use of these fire-places in very many houses, both here in Pennsylvania, and the neighboring States, has been and is a great saving of wood to the inhabitants."

The Pennsylvanian stove consisted of an open grate for the fuel, with front and top like an ordinary stove. An air box with holes in the side-plates was forced behind the fire, leaving a space between its top and the top of the stove. Behind the air-box was a false back shutting-off communication with the chimney at the mantel piece or breast of the chimney, but leaving a space underneath opening into and entering it at the rear of the false back. The smoke from the fire passed up, but the top of the stove stopping its further progress in its upward course, it was carried over the top of the air-box, and descended between the back-plate of the fire-box and the back-plate of the stove (upon a horizontal projection of which the false back rested with a space between each), through the opening under the false back, and up the chimney, heating as it passed the front and back plates of the air-box, and of the stove; the side and bottom plates being heated at the same time. The air of the room behind the back, side, front and top plates of the stove becoming specifically lighter than the other air in the room, was obliged to rise; but the enclosure over the fire-place hindering it from going up the chimney, it was forced out into the room. At the same time the air heated under the bottom plate, and in the air-box, passed up and came out of the holes in the side-plates of the air-box. The air that entered the room through the air-box was fresh, though warm. All this air being continually changed, kept the room at the same time well ventilated. This fire-place was constructed for burning wood, but in 1753 a Mr. Durno adopted it for the burning of coals, and sent one of his stoves as a model to London.

A simple, but highly ingenious grate, in which the fuel is made to consume its own smoke, was also one of the original contrivances of Franklin. It consisted of a cylindrical fire-cage, about a foot in diameter, and from 6 to 8 inches from front to back. The back was of plate iron, and the front filled with bars, of which the three middle were fixed, and the top and bottom ones moveable. Either one of those could be drawn out for the purpose of filling the grate with fuel. The fire-grate turned upon its own axes, supported by a crotchet fixed on a stem, which revolved upon a pivot fixed to the hearth. The fire was lighted by withdrawing the upper bar, and then placing wood and coals as in a common grate; the bar was then replaced. When the fire was first lighted a quantity of thick smoke was emitted, but as soon as it began to burn well, the cage was turned round on its axes, so that the burning coals at the bottom should occupy a position at the top. The whole was then turned round on the pivot, so as to bring the bars again in front; by this arrangement the fresh coals below were gradually ignited, and their smoke having to pass through the lighted fuel above them, was gradually consumed. Little or no soot was deposited, for all the combustible matter was consumed.

Another excellent stove, with a descending current, was constructed by Dr. Franklin for his own use. It was made in the form of a vase, with an opening on the cover, furnished with a hinge. For the body of the vase was a fire chamber, in which the grating was fixed; below this was another space, at the bottom of which was another grating. Directly under the vase was the ash pit, with drawer to receive the ashes. On either side of the ash pit were two horizontal flues connecting with vertical flues, which led into the chimney. The fire was lighted by placing a little charcoal on the upper grating, then by laying some small pieces of wood on the charcoal, and some paper on the wood. When the paper was lighted and the lid shut down, the air passed down through the air-hole, and blowing the flame of the paper through the wood, kindled it, which in turn ignited the charcoal. The flame and the vapor descended through the grating into the lower chamber, and through the second grating in its bottom, then dividing right and left into the horizontal flues, entered the vertical flues, and ascended the chimney. The surfaces of the vase and air-box, and the part of the horizontal channels exposed to the room, were heated by this vapor, and the air, warmed by contact with these, spreads into the room. Every part of it was necessarily air-tight, to maintain an upward draught in the chimney.

We cannot part with Dr. Franklin without giving one remedy out of many proposed by him for the cure of smoking chimneys in open fire-places, as follows: By contracting the space between the jambs to about 2 feet, and to bring the breast down to within about 3 feet of the hearth. An iron frame was placed under the breast, and extended to the back of the chimney, so that a plate of iron could slide backward and forward in the groves on each side of the frame; this plate, when thrust in, filled up the whole space when there was no fire, and thus prevented the smoke from other funnels getting into the room. But when there was a fire, it could be drawn out so as to leave between its further edge and the back a space of 2 inches, which was sufficient for the smoke to pass. At the same time more heated air is kept in the room, which would otherwise go up the chimney. The world owes Franklin a great deal for his valuable stoves. Although subsequent inventions and improvements have replaced his stoves in public favor, there are many now living who cherish the belief that the old Pennsylvanians (better known as Franklin's), were the most comfortable and cheerful stoves ever made.

New Furnace of the Ironton Iron and Steel Company.

Work upon the new furnace of the Ironton Iron and Steel Co. was begun on the 15th of July, 1873. It was well under way when the panic struck the country. Since then it has performed slowly but steadily, until now the various structures stand out with many imposing features, which promise in a few months a complete iron works, glowing with red fires of production. We admire the pluck and energy of the projectors in thus pushing their scheme so successfully through the adversities of the panic.

The state of structure is about this: The brick work and masonary of the casting house are finished, and the roof nearly done. The material is on hand and will be put up in a few days. The stone work and iron casing of the stack are completed and ready for the fire brick; the latter is on the ground. The stone foundation for the boiler and hoisting houses is completed. The three hot blasts (Player) are finished, and splendid specimens of work they are. On the smoke stack the brick work is completed to the square, and the circle is commenced. The stock house is all finished, except the roof. A bridge across the mouth of Storms Creek will be commenced next week. The company have 5000 tons of ore on hand. It would be possible, if the circumstances of the market demanded, to put the furnace in blast in about sixty days. But as times are now, the company do not porpose to hurt themselves by hurrying.

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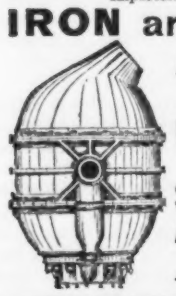
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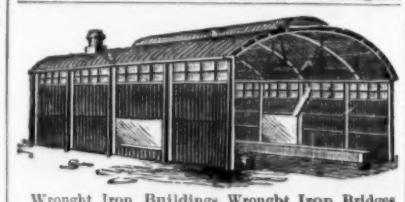
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New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

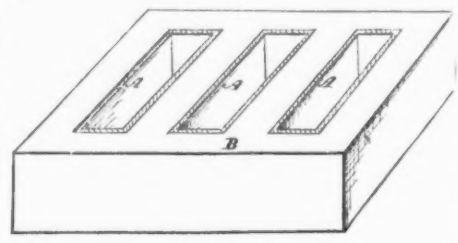
IMPROVEMENT IN THE MANUFACTURE OF IRON AND STEEL.

Specification forming part of Letters Patent No. 152,326, dated June 23, 1874, issued to William Bushnell, New York:

This invention relates to that class of processes in the manufacture of iron and steel wherein iron ores and other oxygen bearing substances are used as decarbonizing agents, and for converting crude iron into wrought iron and into steel, and is, in some respects, similar to the plan and process described in specification filed in the Patent Office January 14, 1874, and for which Letters Patent have been granted.

In that specification are described certain iron vessels and molds lined with wood, in which are commingled and mixed together molten crude iron and granulated or pulverized iron ore for the purpose of decarbonizing and converting such crude iron into wrought iron and into steel. In this invention iron vessels are not used at all, but simply wooden boxes or molds embedded in sand, clay, or other earthy material, and in such boxes or molds so embedded are mixed together granulated or pulverized iron ore or other decarbonizing substance and molten crude iron direct from a blast furnace hearth, or remelted pig iron from a cupola furnace.

The drawing represents three wooden boxes, letters A, A, A, sixteen inches long, six inches wide, and twelve inches deep, embedded in sand, letter B, to their upper edges. These boxes, for convenience of description, I call "ingot molds."



IMPROVED INGOT MOLDS.

These ingot molds may be made of boards of any desired thickness, and may be made of any size, form, or shape required to meet general or special cases, the form and size represented in the drawing being given simply to suggest a weight of iron convenient for handling, reheating and rolling. The aim and object of using wooden ingot molds are to maintain, or to assist in maintaining, the temperature of the molten crude iron while it is acting upon, reducing, and deoxidizing the iron ore commingled with it, and consequently to facilitate the decarbonization and conversion of the crude iron into wrought iron and into steel.

In carrying out this process in a blast furnace, prepare a sufficient number of the wooden ingot molds to receive and contain the quantity of molten crude iron proposed to be drawn from the furnace hearth at a given time, and embed them in sand, loam, or clay, as near to the hearth as convenient, and then, at the proper time, draw the liquid iron from the hearth directly into the molds, charging one at a time in regular succession as the stream of iron reaches them, and at the same moment introducing and mixing with the iron in the molds such quantity of pulverized or granulated iron ore or other decarbonizing substance as may be necessary to convert the crude iron into wrought iron or into steel. In sinking or embedding the ingot molds in sand, loam, or other earthy substance, for the above purpose, care must be taken to have a sufficient quantity of such substance well rammed between and around them to withstand the pressure of the iron in case the molds burn away before the iron chills.

In a cupola furnace, using remelted pig iron, embed or sink the wooden ingot molds in sand, loam, or other earthy material, upon the furnace floor, in same manner above described, and run the liquid iron directly into them by means of a wooden-lined gutter or spout, or convey it to them in iron ladles lined with wood; or, in case it is desired to draw the molten iron directly from the cupola spout or outlet into the molds, use a car or truck having upon it a sheet or plate iron body or box of sufficient dimensions to hold and contain the desired number of the wooden ingot molds, properly embedded in sand or loam, and so arrange the car or truck upon a track that the molds it contains may be brought under the spout or outlet of the cupola for receiving the charge of liquid iron, and at same time receive the proper proportion and mixture of granulated or pulverized iron ore, or other oxygen-bearing or decarbonizing substance, for the purpose hereinbefore set forth.

In order to protect the surface of the molten iron from the atmosphere while it is in its liquid state in the molds, make the molds a few inches deeper than is requisite to contain the charge of iron, thereby causing the flame arising from the burning of the wood to converge over and envelop the surface of the iron while the process is going on.

Claim.—1. The wooden boxes or ingot molds embedded in sand, loam, clay or other earthy substances, upon the floor or in the pig-bed of a blast furnace.

2. Wooden boxes or ingot molds embedded in sand, loam, clay or other earthy material, within the body or box of a car or truck.

IMPROVEMENT IN SURFACING SHEET IRON TO RESEMBLE RUSSIA IRON.

Specification forming part of Letters Patent No. 152,814, dated July 7, 1874, issued to John Stackhouse, of Allegheny, Pa.

This invention relates to a new and useful improvement in the manufacture of sheet iron; and consists of the use of a solution of oxalic acid, or other substance, and water or other liquid, during the rolling of the iron, at or previous to the last rolling.

The sheets of ordinary iron of good quality are placed in "packs" of four sheets, more or less, in a pack, and, previous to heating for the last rolling, immerse the pack in a solution of oxalic acid and water, about one part of the oxalic acid and about nine parts, by weight, of water being used to form the bath. When the iron is heated, the water, of course, evaporates, leaving a slight film on the surface of each sheet of iron, which is converted into carbonic acid gas. This gas combines with the iron, and hardens the surface.

There are other substances which will have the same or a similar effect; but, with oxalic acid, carbonic acid is formed without leaving any residuum or foreign matter. The surface of the iron is, consequently, left clean, and takes a high polish when the sheets are rolled, the iron resembling the best quality of Russia sheet iron.

After the sheets are rolled they are annealed in suitable air-tight vessels, which renders the iron soft and malleable.

The bath may be composed of any other substance that will dissolve in water, and produce carbonic acid when the water evaporates, and leave no residuum when thus converted. Other liquids than water may be used to dissolve such substances for forming the bath.

Claim.—The above described process for manufacturing sheet iron to resemble Russia sheet iron.

Dr. Franklin as an Inventor of Stoves.

Among the many things essayed by Benjamin Franklin for the benefit of his fellow-men, few were more immediately and permanently useful than his inventions and improvements in fuel-saving stoves, and his devices for the curing of smoky chimneys. Franklin saw that the stove was a great civilizer; that when fuel was dear people lived miserably, but that when it was cheap and well managed they lived comfortably. In 1745 Franklin invented a fire-place, which he named the Pennsylvanian, in which he ingeniously combined Prince Rupert's descending flue (a contrivance by which the draught took a downward direction before entering the chimney), and Guager's hollow back jambs and hearth, called caliducts. This invention was described in a pamphlet written and printed by Franklin himself. The following is a copy of the title page: "An account of the new invented Pennsylvanian fire-places; wherein their construction and manner of operation is particularly explained; their advantages above every other method of warming rooms demonstrated; and all objections that have been raised against the use of them answered and obviated. With directions for putting them up, and for the using them to the best advantage. And a copper-plate in which the several parts of the machine are exactly laid down from a scale of equal parts. Philadelphia: printed and sold by B. Franklin, 1744."

The following is from Franklin's Autobiography: "Having, in 1742, invented an open stove for the better warming of rooms, and at the same time saving fuel as the fresh air admitted was warmed in entering, I made a present of the model to Mr. Robert Grace, one of my early friends, who, having an iron furnace, found the casting of the plates for these stoves a profitable thing, as they were growing in demand. To promote that demand I wrote and published a pamphlet, entitled, 'An Account of the new invented Pennsylvanian fire-places, etc.' This pamphlet had a good effect. Governor Thomas was so pleased with the construction of this stove, as described in it, that he offered to give me a patent for the sole vending of them for a term of years; but I declined it from a principle, which has ever weighed with me on such occasions, viz., 'That as we enjoy great advantage from the invention of others, we should be glad of an opportunity to serve others by an invention of ours; and this we should do freely and generously.'

"An ironmonger in London, however, assuming a good deal of my pamphlet, and working it up into his own, and making some small changes in the machine, which rather hurt its operation, got a patent for it there, and made, as I was told, a little fortune by it. The use of these fire-places in very many houses, both here in Pennsylvania, and the neighboring States, has been and is a great saving of wood to the inhabitants."

The Pennsylvanian stove consisted of an open grate for the fuel, with front and top like an ordinary stove. An air box with holes in the side-plates was forced behind the fire, leaving a space between its top and the top of the stove. Behind the air-box was a false back shutting-off communication with the chimney at the mantel piece or breast of the chimney, but leaving a space underneath opening into and entering it at the rear of the false back. The smoke from the fire passed up, but the top of the stove stopping its further progress in its upward course, it was carried over the top of the air-box, and descended between the back-plate of the fire-box and the back-plate of the stove (upon a horizontal projection of which the false back rested with a space between each), through the opening under the false back, and up the chimney, heating as it passed the front and back plates of the air-box, and of the stove; the side and bottom plates being heated at the same time. The air of the room behind the back, side, front and top plates of the stove becoming specifically lighter than the other air in the room, was obliged to rise; but the enclosure over the fire-place hindering it from going up the chimney, it was forced out into the room. At the same time the air heated under the bottom plate, and in the air-box, passed up and came out of the holes in the side-plates of the air-box. The air that entered the room through the air-box was fresh, though warm. All this air being continually changed, kept the room at the same time well ventilated. This fire-place was constructed for burning wood, but in 1753 a Mr. Durno adopted it for the burning of coals, and sent one of his stoves as a model to London.

A simple, but highly ingenious grate, in which the fuel is made to consume its own smoke, was also one of the original contrivances of Franklin. It consisted of a cylindrical fire-cage, about a foot in diameter, and from 6 to 8 inches from front to back. The back was of plate iron, and the front filled with bars, of which the three middle were fixed, and the top and bottom ones moveable. Either one of those could be drawn out for the purpose of filling the grate with fuel. The fire-grate turned upon its own axes, supported by a crotchet fixed on a stem, which revolved upon a pivot fixed to the hearth. The fire was lighted by withdrawing the upper bar, and then placing wood and coals as in a common grate; the bar was then replaced. When the fire was first lighted a quantity of thick smoke was emitted, but as soon as it began to burn well, the cage was turned round on its axes, so that the burning coals at the bottom should occupy a position at the top. The whole was then turned round on the pivot, so as to bring the bars again in front; by this arrangement the fresh coals below were gradually ignited, and their smoke having to pass through the lighted fuel above them, was gradually consumed. Little or no soot was deposited, for all the combustible matter was consumed.

Another excellent stove, with a descending current, was constructed by Dr. Franklin for his own use. It was made in the form of a vase, with an opening on the cover, furnished with a hinge. For the body of the vase was a fire chamber, in which the grating was fixed; below this was another space, at the bottom of which was another grating. Directly under the vase was the ash pit, with drawer to receive the ashes. On either side of the ash pit were two horizontal flues connecting with vertical flues, which led into the chimney. The fire was lighted by placing a little charcoal on the upper grating, then by laying some small pieces of wood on the charcoal, and some paper on the wood. When the paper was lighted and the lid shut down, the air passed down through the air-hole, and blowing the flame of the paper through the wood, kindled it, which in turn ignited the charcoal. The flame and the vapor descended through the grating into the lower chamber, and through the second grating in its bottom, then dividing right and left into the horizontal flues, entered the vertical flues, and ascended the chimney. The surfaces of the vase and air-box, and the part of the horizontal channels exposed to the room, were heated by this vapor, and the air, warmed by contact with these, spreads into the room. Every part of it was necessarily air-tight, to maintain an upward draught in the chimney.

We cannot part with Dr. Franklin without giving one remedy out of many proposed by him for the cure of smoking chimneys in open fire-places, as follows: By contracting the space between the jambs to about 2 feet, and to bring the breast down to within about 3 feet of the hearth. An iron frame was placed under the breast, and extended to the back of the chimney, so that a plate of iron could slide backward and forward in the groves on each side of the frame; this plate, when thrust in, filled up the whole space when there was no fire, and thus prevented the smoke from other funnels getting into the room. But when there was a fire, it could be drawn out so as to leave between its further edge and the back a space of 2 inches, which was sufficient for the smoke to pass. At the same time more heated air is kept in the room, which would otherwise go up the chimney. The world owes Franklin a great deal for his valuable stoves. Although subsequent inventions and improvements have replaced his stoves in public favor, there are many now living who cherish the belief that the old Pennsylvanians (better known as Franklin's), were the most comfortable and cheerful stoves ever made.

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Work upon the new furnace of the Ironton Iron and Steel Co. was begun on the 15th of July, 1873. It was well under way when the panic struck the country. Since then it has performed slowly but steadily, until now the various structures stand out with many imposing features, which promise in a few months a complete iron works, glowing with red fires of production. We admire the pluck and energy of the projectors in thus pushing their scheme so successfully through the adversities of the panic.

The state of structure is about this: The brick work and masonary of the casting house are finished, and the roof nearly done. The material is on hand and will be put up in a few days. The stone work and iron casing of the stack are completed and ready for the fire brick; the latter is on the ground. The stone foundation for the boiler and hoisting houses is completed. The three hot blasts (Player) are finished, and splendid specimens of work they are. On the smoke stack the brick work is completed to the square, and the circle is commenced. The stock house is all finished, except the roof. A bridge across the mouth of Storms Creek will be commenced next week. The company have 5000 tons of ore on hand. It would be possible, if the circumstances of the market demanded, to put the furnace in blast in about sixty days. But as times are now, the company do not porpose to hurry themselves by hurrying.

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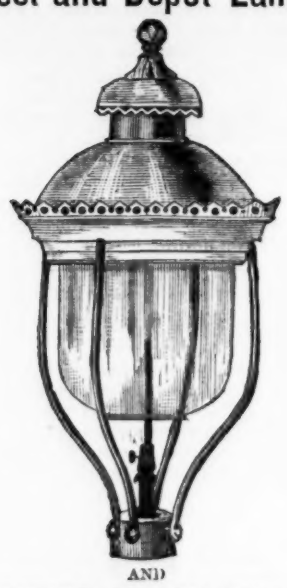

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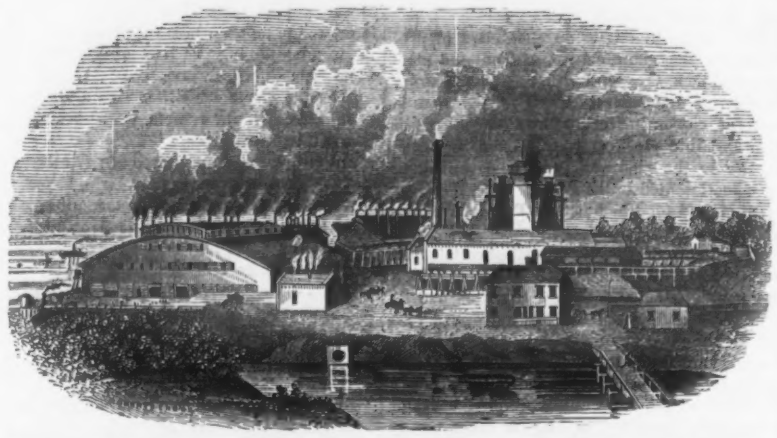

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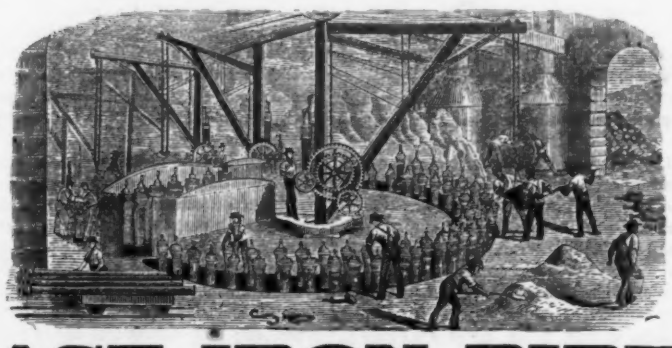

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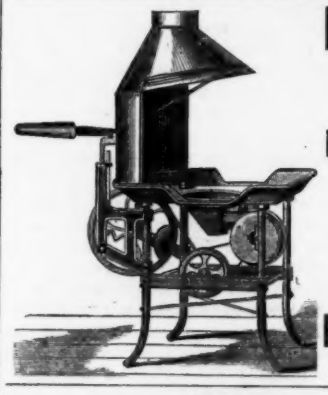

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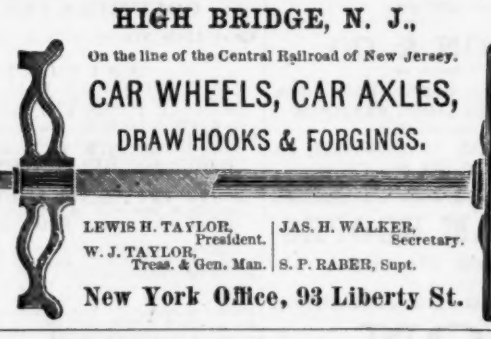

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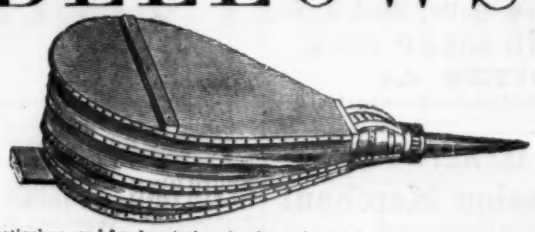

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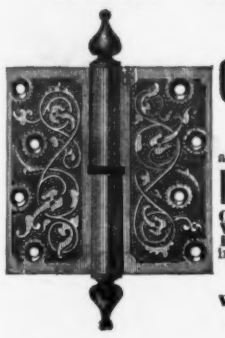

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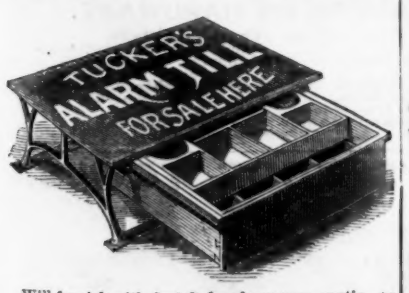

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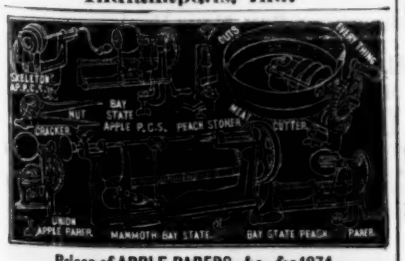

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Price List with description sent on application.

See wholesale price current in this paper

The Metal and Mechanical Industries of Watertown.

Watertown, the county seat of Jefferson county, New York, is admirably fitted by its location and natural facilities to become a manufacturing center of considerable importance. The ore beds at Antwerp, 25 miles from the city, are likely to furnish sufficient quantities of ore to last for many years to come. As regards the shipment of goods, we have already alluded to the facilities which Watertown possesses in our description of the ore beds of Northern New York.

Among the prominent manufactories of Watertown is that of the Watertown Steam Engine Co. This concern manufactures steam engines, boilers, saw mills, pumps, water wheels, paper mill machinery, and car wheels. The establishment consists of two buildings, and comprises an iron and brass foundry, machine shop, boiler, blacksmith, pattern, paint and sheet iron shops and packing room. The larger of the two buildings is shaped somewhat like an L, and on its ground floor is the foundry containing two cupolas capable of runing about five tons per day. Adjoining this are the shipping and painting rooms, and a portion of the machine shop. A machine for planing the faces of pulleys, designed in this shop, is worthy of notice. The pulley to be planed is secured to an internally geared wheel. The latter is actuated by a small pinion connected with the shafting. The pulley is thus caused to revolve, and a planer, arranged upon a cross feed, planes off the face of the pulley. The planer, by suitable connection with the main shaft, is fed automatically. The whole moves very steadily and with considerable speed. With this machine a large or small pulley may be planed with equal facility. On the ground floor is also the testing room, in which all engines, when completed, are fired up and tested. By means of a brake the engine is made to overcome there as much resistance as it would probably ever be called on to overcome in actual use.

Upon the next floor are extensive machine shops containing the machinery usually found in such a place. The milling machinery is quite a notable feature here, and, also, a machine for boring and milling the interior of cylinders. It is 16 feet long.

In the other building is located the blacksmith shop. Here the cranks are forged; the company is beginning, however, to use cast steel cranks. The boiler shop is also in this building, and contains a somewhat peculiarly contrived punch. It is provided with a long horizontal lever, cam shaped at the end, which is kept constantly in motion. The head of the punch and the end of the lever do not touch each other, and, therefore, the punch, ordinarily, is stationary. When, however, a wedge is placed between the head of the punch and the end of the lever the punch is then forced downward. Consequently, when the workman wishes to operate the punch he simply inserts a wedge over its head.

Among the specialties which this company manufactures is a stationary engine. They claim that the metal in this engine is so distributed as to obtain the greatest strength. The cylinders having been properly bored and finished, the head of the cylinder is securely attached to the bed frame. The steam chest is the length of the cylinder, in order to place the steam ports as near the ends as possible, to avoid waste of steam in filling long passages. It is placed on the side of the cylinder, permitting a direct connection between the valve rod and the eccentrics with only one joint. They also build a return tubular boiler, whose shell is so extended as to form a smoke box. This is intended to secure strength and durability, and to do away with the joint, which sometimes springs open, permitting smoke and ashes to escape into the boiler room. The company manufacture a column pump, which is fitted with both lift and force pumps, and is so constructed that each can be worked independently of the other, or both can be worked together. The lift pump, when detached, is provided with a lever to be operated by hand. The company claim the greatest advantages, however, for their Excelsior engine. In this engine the cylinder is encased in the upper part of the dome, and is surrounded by steam, and as no external air can come in contact with the cylinder, it is claimed that there is no condensation of steam in it or in the steam pipes. Such a result would avoid pounding and strains. The heater, also encased by the dome, is placed directly under the boiler, securing the pipes from frost, and heating the water before it enters the boiler. The pillow blocks, which support the crank shaft and band wheels, are connected with the cylinder centrally by an iron frame, one end of which is bolted to the end of the cylinder, while the other rests upon and is secured to cast iron brackets bolted to the boiler, so that the connecting rod is in a direct line with the center of the frame of the engine. This arrangement is intended to secure a uniform strain to be sustained by the frame alone in the direction of its greatest strength. The company also manufacture an engine for agricultural purposes, constructed like the Excelsior, and mounted on wheels. The smoke pipe is hinged near the bottom, and can be turned down into a saddle prepared for it. A circular saw mill is also manufactured here, so arranged that a single lever controls all the movements of the carriage, and a set lever sets both ends of the log at once. The principal piece of work which they have now in hand is a pump for the city of Watertown. It is to have two cylinders, and the bore of each is to be 12 in., the stroke 42 in. It is to raise 75,000 gallons per hour, and is to be driven by water-power. The water is to be raised 200 ft.

Near to the works, we have just described, is the plow factory of Ten Eyck, Utley & Co. The works consist of two buildings, one of which is the foundry and the other contains the finishing shops. This concern manufactures both cast and steel plows. The agricultural implement business being at this season of the year dull, the shop is occupied in preparing castings for the fall trade. They are now melting three tons of iron per week.

Considerable skill must be exercised in the manufacture of plow castings, especially in chilling the edge of the mold board. This is accomplished by the use of a steel guard, which covers that portion of the casting which it is necessary to chill. A new process has just been introduced for chilling the whole face of the mold board. It is desirable that it have a certain degree of hardness, so that the mud will not stick to it, but if the casting is too hard it will break. The process, therefore, requires skill.

The principal portion of the finishing building is used for shaping the wood work. In making a plow handle the stuff is first sawed up into pieces of the requisite shape, the handles are then trimmed off and the wood afterward steamed and bent in clamps. The various portions of the plow are next fitted to each other and to the iron portion, and painted. The various metallic portions of a cast iron plow are simply cast into the appropriate shapes and secured together. In the case of a steel plow, however, they must be pressed into shape. The steel, having been cut according to a pattern, is heated and pressed, and then tempered without reheating. The finishing building comprises a wood and paint shop, store rooms, machine shop, pressing and grinding shop, and blacksmith shop.

The manufactory of the Davis vertical feed shuttle sewing machine is located in Watertown. The company which manufactures this machine was organized about five years ago. Its factory is very large (240x55 ft.), and contains four stories and a basement, the later extending half the length of the building. All the machinery is run by water-power. The manufacture of a sewing machine is in the last degree complicated. It involves a multitude of operations, and the greatest amount of care and arrangement is necessary to keep in hand the many details of the manufacture.

The pieces which constitute the machine are first cast in the foundry. The castings are next cleaned and inspected, and the imperfect ones rejected. Each casting goes to its special department and is finished. The parts of the cast iron frame which supports the sewing apparatus are fitted together and painted. In the construction of the sewing apparatus the order is very nearly as follows: The bed plate of the machine is first put in the race covers, and the needle and other holes made in it. Then the arm is bolted to the bed plate, and the needle is adjusted to the slot. It is then taken to the japanning room, and those portions which are to be japanned are subjected to that process. The machine is then front fitted, that is, the face plate, bars and other details which belong to the front of the machine are attached. It must be borne in mind that these details are, meanwhile, in another portion of the shop undergoing various operations to prepare them for adjustment, such as planing, drilling, turning, milling and profiling. The machine is then "adjusted," *i. e.*, the cams and other working parts are placed in position. The machine, then, as far as constructed, is taken apart and each piece is numbered, after which they are taken to the polishing room and polished on emery wheels. The various parts of the machine are then brought together again and "readjusted," *i. e.*, the machine having been reconstructed, other working parts, such as the lifter, are added. The machines are then in running order, but previous to their leaving the shop they are each run by power for five consecutive hours. This operation is called "jacking," and is accomplished by placing a large number of the machines on a frame and connecting them with a main shaft by means of small belts. In this operation the machines are put in perfect running order. At several stages in the manufacture the work is inspected carefully, and imperfect work thrown out. The machines having been jacked are secured to the frames, and are packed and shipped.

The machine shop extends for almost the whole length of the building, and occupies nearly an entire floor. One line of shafting extends throughout the room, and drives two lines of machinery. The machinery embraces planers, presses, milling machinery, screw cutting and profiling machinery, etc. This concern cut and mill out all their shuttles from solid steel blocks. At the end of this room is the ornamenting room, in which the colored designs are placed upon the bed plates of sewing machines by the decalcomaine process.

On another floor is the fitting and mounting shop, where the several parts of the machine, after having been prepared in the machine shop, are put together. Here, also, the machines are jacked. Adjoining the fitting room is the testing room, in which the different machines are actually tried by sewing with them. Another room on this floor is devoted to polishing the various details of the machine. Still another room on this floor is devoted to japanning. The third floor is used as a boxing department. In the basement is the blacksmith shop, needed rather for repairing the machinery than in any part of the manufacture.

The machine manufactured at the works we have been describing is claimed to possess several advantages over others, but we refer here only to the one which gives it its name, and which is its prominent feature, viz., its peculiar feed. The feeds commonly in use in other sewing machines are known as the wheel feed, and the ratchet or four motion feed. The former consists of a revolving wheel which is automatically moved forward at each stitch, the teeth of which project sufficiently above the bed of the machine to take hold of and carry forward the fabric. The ratchet feed usually consists of a horizontal under feed bar, which has a four motioned movement produced by suitable under gear. This feed bar is also furnished with teeth which raise high enough above the bed of the machine to also take hold of and carry forward the work. A presser foot in both cases comes down on the goods and holds them firmly to the surface of feed. The objection which has been urged against these feeds is that the presser foot retards the motion of the upper ply of the goods, while the feed is moving forward, therefore the lower ply moves faster than the upper, and therefore the goods do not come out even. In the vertical feed sewing machine the goods rest upon the smooth surface of the bed plate, and are held firmly down by the presser foot until the needle has penetrated the fabric, at which time the pressure on the fabric is being transmitted from the pressure foot to the vertical feed bar (which comes down on the goods close behind the needle) by means of a lever connecting the two, so that when the needle has reached its lowest point, the full pressure is transmitted to the feed bar, at which time the needle bar and feed bar are both moved laterally the desired length of the stitch. The advantages of such an arrangement are apparent.

Adjoining the sewing machine factory is the foundry and machine shop of Messrs. Bagley & Sewell. This concern manufactures steam engines and boilers, sewing machine castings, saw mills, paper mill machinery, gearing and water wheels. The works consist of seven buildings. The light foundry is used entirely for sewing machine castings. These are supplied to the works we have just described; they are very numerous, and the largest seldom weigh over 60 lbs. The building measures 100x50 ft., and has two cupolas of about nine tons capacity. At the end of this foundry is the pattern store room. The heavy foundry is smaller than the preceding, and has one cupola, capable of melting four tons per day. About one-half of the sand used in this foundry comes from Waterford, near Troy; the coarser sand is taken about one mile from Watertown. Owing to the dullness of the times this concern is doing little outside of sewing machine work. The next building has two floors, the lower one being used for cleaning castings. Sewing machine frames, after they leave the flasks, are placed in weak vitriol, and afterward rinsed off in water. This is done in the cleaning room. The smaller castings are tumbled. The upper part of the building is used as a pattern shop. The next building is used for storing sand and iron below, and coal above. Two other buildings come next, one being the blacksmith and the other the boiler shop. The machine shop is a large building, 200 ft. by 40 ft. in dimensions. Here are six planers, one of which will plane 22 ft., twelve lathes, one of which swings 36 inches, a boring mill, drills, a gear cutting machine and a slotting machine. As usual the machinery of the entire works is run by water-power.

Engineering in Odessa.—The Engineering and Iron Foundry, Limited, Bellino Feuderich, Odessa, is an establishment which appears to be worth attention. Originally the works belonged to Bellino Feuderich & Co., who, some fifteen years ago, opened a depot for agricultural implements to meet the requirements of the landed proprietors. They commenced a small repairing shop, but now employ about 600 men in the manufacture of fixed and portable steam engines from 4 to 40 horse-power, marine and Cornish and other boilers, cisterns, reservoirs, copper and brass work for sugar works, mills of all sizes, horse thrashing machines, castings of every description; daily consumption of iron upward of five tons. Anthracite is employed for foundry purposes, being found in the country in large quantities. Apart from what they manufacture themselves, all kinds of implements are kept in stock—the ploughs of Howard, the reapers of English and American makers, the well-known steam thrashing machines of Lincolnshire agricultural engineering firms. The principal object of the firm in whatever they manufacture or receive from abroad has been to put into the hands of the landed proprietors machinery of the simplest construction consistently with the durability. Machinery has been often supplied to the Caucasus and other remote parts of the empire. In mill work they have been eminently successful, and they are now directing their attention to the plant necessary for sugar fabrics and paraffine distilleries which exist in such great numbers in the government of Kiew. The works have been recently much enlarged. Every possible attention is now given in the selection of first-class material and the employment of skilled workmen, as well as in the prompt execution of orders. The Russian government permit importation of unwrought iron free; bars and plates also come under this head, and, in fact, have indirectly encouraged the firm to a great extent. The Turks would do well to take a lesson from the same book, and drop their dog-in-the manger policy.

Banner's Patent Drain Trap.—This trap, which is of English origin, consists of an air-tight chamber of cast iron or other material fitted with an inlet pipe, which projects several inches into its interior; the lower end of this inlet, surrounded by an India rubber band sprung on and slightly projecting beyond the end of the pipe, is closed and made air-tight by a copper cup of peculiar form, being pressed up to it by a suitable weight mounted upon a lever fulcrumed on an air-tight center, and having its outer end bent upward at right angles. The weight is suspended by a link on the raised end of the lever, and is so arranged that when the pan is in the act of tilting, the center of gravity of *the weight* is brought nearer the fulcrum, thus reducing the load, and allowing the pan to remain open till it is thoroughly flushed, yet retaining sufficient power to close the trap again after flushing. A series of holes in the raised end of the lever permit of a proper adjustment of the weight, and the bend in the soil pipe, just above the trap, breaks the force of the water reaching the latter from above. The lower part of the chamber is formed with sloping slides, terminating in an outlet in connection with the drain. This trap is said to effectively intercept the flow of sewer gas into dwellings.

THE NICHOLSON FILE.

All Nicholson Files are cut with the Patent *Increment Cut*, an invention owned and controled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformityof machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

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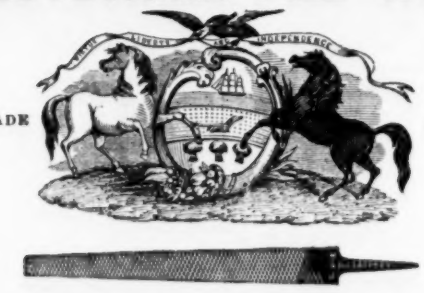
TRADE  MARK

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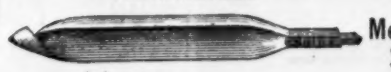

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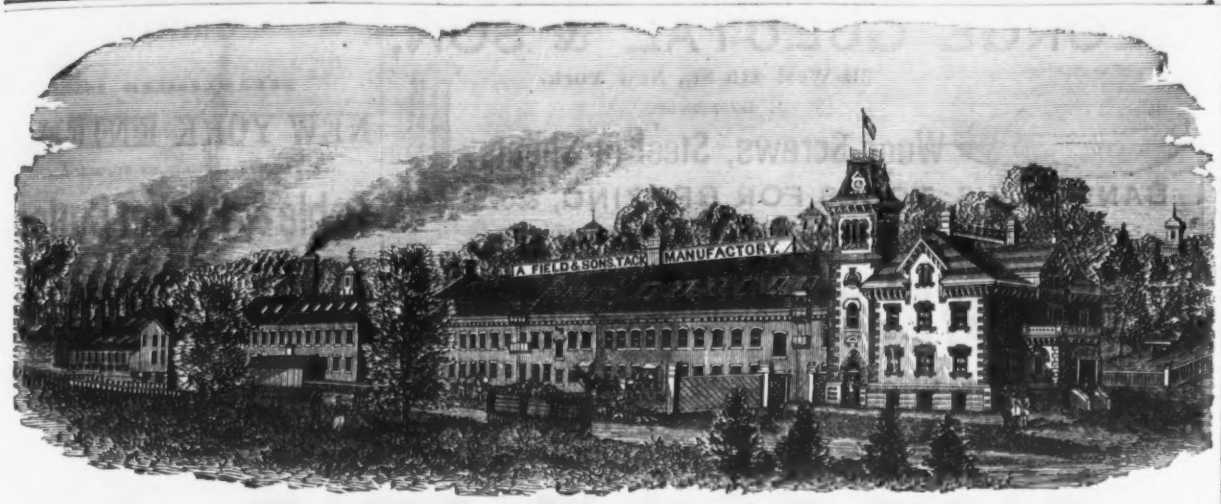

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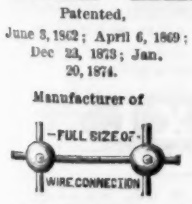

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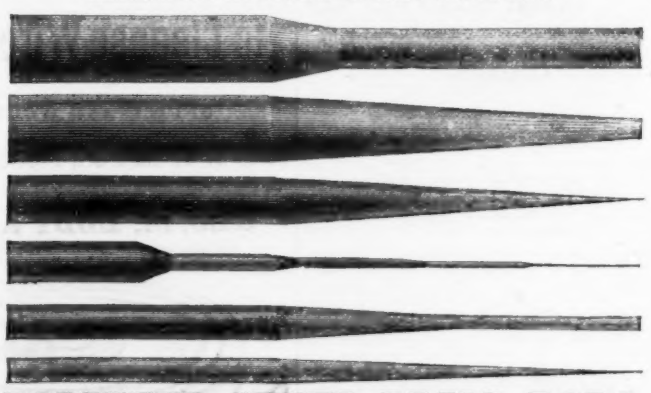

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BUSINESS ITEMS.

NEW YORK.

The Rogers Iron Company, of New York, has bought a tract of land at Elizabethport, N. J., and will at once erect large buildings.

NEW JERSEY.

It is reported that extensive iron works are to be established at Washington, and several sites have been inspected under the direction of the Schuylkill Iron Company, of Pottsville. It will require a capital of $175,000 to push the new enterprise through, and it is thought that sum will be easily raised.

PENNSYLVANIA.

The United States Iron and Tin Plate Works, at McKeesport, will start up soon.

Osceola is to have a foundry and machine shop.

At the Bethlehem Steel Works, 16 ingots of steel were successfully turned out in one day, lately, which is the largest quantity ever manufactured in one day at these works.

The firm of Harbaugh, Matthias & Owens, of the Superior Iron Mills, at Pittsburgh, have gone into involuntary bankruptcy. They suspended a few days since.

The Reading Railroad Company proposes to give Philadelphia an iron ship building yard of vast proportions and absolute completeness, an invaluable feature of which shall be a dry dock capable of docking any vessel that floats, excepting alone the Great Eastern. This ship yard is under way, and upon it over half a million dollars have been spent.

MASSACHUSETTS.

The State contract for rebuilding the bridges of Williamsburg, and the contract for Hayden, Gere & Co.'s dam and mill foundation, have been awarded to Messrs. Delaney & Sons, of Holyoke. The amount of the contract will reach $50,000, and to complete it will require six months. They are to build the abutments and wing walls to nine bridges, 5000 feet of river wall, Hayden, Gere & Co.'s dam, and the foundation for their new foundry, which is to be erected on the old site, and will be 335x35 feet in dimensions. The contract was awarded to them out of twenty-nine bidders.

It is said to be the purpose of the Florence Sewing Machine Company to add to their present business the manufacture of a patent improved skate. It will be placed on the market the coming autumn.

The Mason Machine Company, of Taunton, have received some large orders for supplying cotton machinery, and will soon increase their operating force on full time.

The projectors of the proposed new brass works, at Holyoke, are taking the preliminary steps toward the formation of a company. The capitalists very generally favor the enterprise by subscribing to the capital stock, a good proportion of which is already bargained for, and the prospects of a speedy erection of the new works are very flattering. The location of the new buildings has not been decided upon, but the most favorable site is in the vicinity of the new screw and alpaca works.

The Ames Manufacturing Company, of Chicopee, have concluded an arrangement with the Connecticut Screw Company, at Tariffville, to furnish them 109 sets, or 327 screw machines, at a cost of about $250,000.

A new Corliss engine of 1200 horse-power has been lately put up in operation by the Boston Manufacturing Company, at their factory at Waltham.

CONNECTICUT.

The Winchester Arms Company, of New Haven, has sublet the contract for making 40,000,000 cartridges for the Turkish government to the Union Metallic Cartridge Company, of Bridgeport.

The Farrel Foundry and Machine Company, of Ansonia, have received another lot of condemned cannon, which will be melted over and used for more peaceful utensils.

The works of the Meriden Britannia Company started up again last week, which will create a revival in business throughout the whole town.

OHIO.

A new company has just been incorporated at Sheridan, called the Sheridan Coal and Iron Company, with a capital stock of $300,000.

A manufactory for making wheels for agricultural implements, located at Napoleon, is to be removed to Muncie, Ind., Judge Sample having donated several acres of land.

William Richards & Son, Champion, have closed their puddling mills. The finishing mills and blast furnace will continue in full force.

ILLINOIS.

A. N. Bain & Co.'s Foundry, at Charleston, turn out about 10,000 stoves per year, and does a great deal of job work. A great amount of machinery for broom corn cleaning is made in the foundry and shops.

The Springfield Rail Mill is running steadily on iron.

The Chicago Cutlery Manufacturing Co. are running 135 hands on full time, turning out their standard butcher knives and table cutlery. The factory is of brick, 120x42 feet, two stories, and there are a forging shop, and boiler and engine house, with a 200 horse-power Corliss engine. Their goods are sold to jobbing houses exclusively, in all parts of the country.

MISSOURI.

The Deer Creek Consolidated Mining Company, organized at St. Louis in June last, are now operating in Utah with great energy. They claim to have enormous deposits of silver bearing lead ore, yielding 72 ounces of silver a ton. The mine is located 75 miles from the Central Pacific Railroad track, but about 100 miles from the nearest station accessible, which accounts for slow progress of arrangements for smelting operations. The superintendent, Mr. Harper, reports that a site for three furnaces has been prepared, and that lumber and other materials and goods are now on the road.

The St. Louis Rail Fastening Company have been established since 1870. They have three heating furnaces, two trains of rolls and three spike machines. Steam is motive power, and the products are spikes and bolts. The annual capacity is 6000 net tons. The average production about 35,000.

A new furnace, costing with necessary buildings, &c., over $200,000, was blown in at the Ozark Iron Works, at Rolla, on the 10th ult.

The works of the St. Louis Bolt and Iron Company were built in 1873. They have two single and two double puddling furnaces, three heating furnaces and two trains of rolls. The works are operated by steam-power, and the products are bar iron, small T and street rails, fish plates, bolts and washers. The annual capacity is 6000 net tons.

TENNESSEE.

The Brownsport Furnace is situated at Brownsport, Decatur county, three miles from the Tennessee River, and is one of the best furnaces in the State. It has 12,000 acres of land, splendidly timbered. There is no furnace in operation nearer than 35 miles. Timber can be bought for ten cents per cord, in the tree, from the adjacent farmers or planters. This furnace is under the management of Geo. W. Davis, of Powellsville, Scioto county, Ohio, and is making 18 tons of No. 1 iron per day (24 hours). The ore is abundant and clear of flint, which is an exception in this State. It costs, pounded and put in the bridge house, only $2 per ton.

The foundry and machine works at Kingston will commence operations in a few days.

The rolling mill of the Roane Iron Company, at Chattanooga, is running full time.

KENTUCKY.

A new furnace is to be erected at Worthington, by a new company, called the "Green County Iron Works Company," having a capital of $600,000. The company will manufacture pig iron.

A co-operative mill is to be started at Newport, by several Cincinnati men, who have purchased the Old Wolf Mill property, and are putting in new machinery. It is expected that it will be in operation in a few weeks.

MARYLAND.

The Baltimore Bridge Co. have received a contract to build two iron bridges for the Lima & Huach Railroad, of Peru. Each bridge will consist of two spans, each span sixty feet in length. In all, the Baltimore Bridge Co. have constructed thirty-one bridges for different corporations in South America, one of them being more than five hundred feet in length, and at one point two hundred and fifty-two feet in hight.

Contamination of Drinking Water in a Well Near a Gas House.

Ferdinand Fischer reports having analyzed the water from a well in Hannover, situated nearly 1000 feet from the gas works. The analysis was made Sept. 20, 1873. A liter of water contained—

	Milligrammes.
Organic matter	4198·4
Chlorine	440·2
Sulphuric acid (SO_3)	991·6
Nitric acid (NO_5)	2·2
Nitrous acid	0·0
Ammonia (NH_3)	81·6
Lime (CaO)	906·1
Magnesia (MgO)	136·2
Total hardness	109·70

The microscope failed to detect any organisms, notwithstanding the extraordinary quantity of ammonia and organic matter. On the other hand it was found to contain 400 milligramms of sulphocyanide of potassium to the liter. A mixture of 15 parts of gas water with 85 parts pure water gave a similar reaction for the sulphocyanides, showing that this well water contained 15 per cent. of gas water. Pelikan and Setschenow found, by experiment, that the sulphocyanides are poisonous, hence the danger of using such water is at once apparent, even aside from the enormous quantity of organic matter, which was 100 times greater than is allowable, and of chlorine, which exceeded the proper limit by 12 fold. No poisonous metals were detected, nor was creasote or other tarry matter recognized.

A New Refrigerating Process.—A new process of refrigeration, adapted to the preserving of food, has recently been devised by M. Tellier, a French civil engineer. It consists in maintaining, in the receptacle in which the material to be preserved is placed, a temperature of from 30° to 32° Fah., in order to produce which the condensation of methylic ether is employed. This ether is gaseous at the ordinary temperatures, but liquefies at —23° and distils at + 5·8° Fah. The apparatus principally consists in a cooler, in which the ether is placed. The vapors of the latter, which escape at a tension of about 1½ atmospheres and at the temperature of 58° Fah., are compressed in a condenser at 6, 7 and 8 atmospheres. They then liquefy, and are returned to the cooler, so that there is a constant circulation. The cooler resembles a tubular boiler, since it is traversed by a large number of tubes. The ether is placed in the body of the vessel, and a solution of chloride of calcium is pumped through the pipes, and thence, becoming cooled, is led through the receptacle in which the meat, etc., is contained. The effect of the intensely cold liquid current is to cool the air in the chambers to the freezing point of water, when watery vapor and atmospheric germs become deposited in the form of hoar frost. The solution is then conducted back to a reservoir, and thence through the cooler pipes again. A committee from the French Academy of Sciences, deputed to examine this invention, speak of it very highly, and state that meat thus kept for months, and subsequently cooked, was found to be in perfectly fresh condition.

H. W. PEACE,

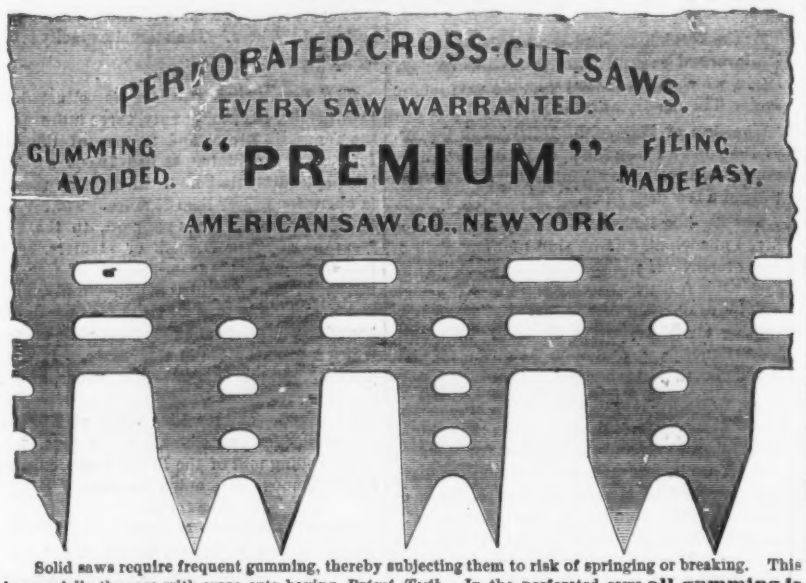
MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

TRENTON, NEW JERSEY.



Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avoided** and the teeth are easily kept long and in *proper shape*, saving *files*, *labor*, *expense* and *vexation* As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.

The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
VULCAN SAW WORKS,
WILLIAMSBURGH, N. Y

THE SILVER STEEL

DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

PATENT HANDLES AND GAUGE INCLUDED.

Patent Secured

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO., Indianapolis, Ind.**, who are the

SOLE MANUFACTURERS FOR THE UNITED STATES.

So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE WORLD. Orders promptly filled.

E. C. ATKINS. H. KNIPPENBERG. **E. C. ATKINS & CO.**
Saw Manufacturers and Repairers, Indianapolis, Ind.

NEW YORK SCREW BOLT WORKS.

(Estate of R. J. DEWHURST, deceased.)

JOHN COCHRANE, Executive Agent and Manager,

Office and Works, cor. Ave. D and 11th St., N. Y.

Bolts, Nuts, Turnbuckles, Washers, Forgings, &c

The attention of large consumers solicited.

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NORWICH, CONN.

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Wood Screws, Steel in Sheets,

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Bed Screws, Pin Hinges, and Wire Nails a Specialty.

E. M. Boynton,

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NEW YORK,

Manufacturer of

LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.

Note extra steel and durability over the old **V**, outlined on **M** tooth.

I am willing and extremely anxious, on proper notice, to accept a Challenge from H. Disston & Sons, or any responsible Saw Manufacturer, and am ready to back my words with appropriate deeds and $500 expense, if beaten.

N. B.---With Hand, Billet or Cross Cut Saw, $500 on each.

E. M. BOYNTON.

I make a specialty of the LARGEST SIZES of **Circular Saws**, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "**Challenge**" **Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

Patent Automatic Muzzle.

[From the *New York Times*, June 22.]

"Mr. Bergh has a muzzle that he recommends, as it does not FRET OR WORRY the dog when on his head. By a spring the dog can open his mouth to the fullest extent, and running out his tongue, pant with as much comfort as though he was not muzzled, and drink without any difficulty, but it is impossible for him to bite." The most humane invention of the age.

Manufactured by
W. T. & J. MERCEREAU, 62 Duane St., N. Y
Sold by all Hardware Dealers.

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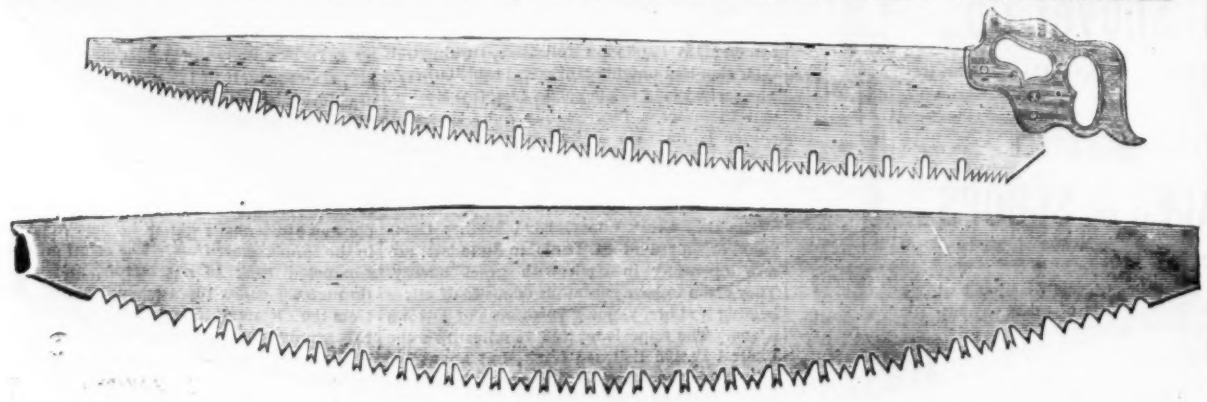
Manufacturers of all kinds of SAWS and PLASTERING TROWELS, Rochester, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for illustrated Price List.



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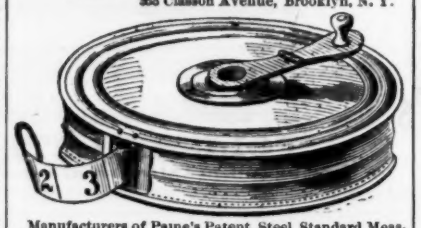
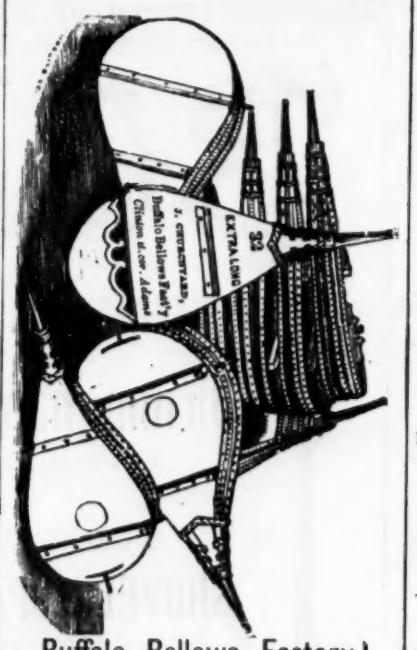


Manufacturers of Paine's Patent Steel Standard Measuring Tapes, for Surveyors, Engineers and Mechanics requiring a correct measure of great length according to U. S. Standard. Also of Tape measures for the same trades, Lumbermen, Machinists, Tailors, Shoemakers, Dressmakers, &c. Catalogues on application.



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Handsomest, Cheapest, most Durable Cutlery in use.
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AMERICAN
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MANUFACTURED BY Aaron Burkinshaw. AB *PEPPERELL,* MASSACHUSETTS.

My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society; also a Medal and Diploma from the Mass Mechanics' Ass'n Sept., 1869

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Landers, Frary & Clark,

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OF EVERY DESCRIPTION. ALSO.

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American, German, English

Pen, Pocket & Combination Knives.

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Sole Proprietors of the renowned full concaved patent

"ELECTRIC RAZORS."

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TABLE KNIVES AND FORKS OF ALL KINDS,

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And the "Patent Ivory" or Celluloid Knife. These Handles never get loose, are not affected by hot water, and are the most durable knives known. Always call for the Trade Mark "MERIDEN CUTLERY COMPANY" on the blade. Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers Street, New York.

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The only Knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the Best American Knife. We also make

NICKEL & SILVER PLATED POCKET KNIVES

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory or by

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PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, August 10, 1874.

Everything points to a busy fall, and a trade which shall surpass in volume any we have had at this period for several years. The absentees are returning, merchants are beginning to arrive, the "want" columns of the newspapers, the surest barometer, by the way, of the business condition, are growing in length, and already the dry goods and shoe trades are doing a fair package business. Philadelphia is attracting more attention of late than for a long time, and is apparently now entering upon a period of very general activity and improvement. Notwithstanding the panic our records show an increased number of buildings erected over last year. The railroad facilities afforded are superior now to those of any other city, since the Pennsylvania Company has connected the river front with the main line, and delivers or collects through freight from the wharves direct. Our steamship lines are growing in size and importance, with offers of new enterprises; while the Reading Railroad Company is finishing a ship yard, dock and plate mill, which will not be equalled in the country. Numerous building enterprises, of great magnitude, are on foot, and as an experienced Eastern builder, attracted here by the Centennial work, lately told the writer, "for the next five years Philadelphia offers the best show to make money in of any city in the United States." After which modest inflation of the individual horn, let us proceed to business, or, in the stereotyped phrase of a well known manufacturer, who always opened his business meetings with "now that we have came together let us not be weary in well doing!" Before leaving the subject, let me add that Philadelphia manufacturers also advertise *en prince*, as witness the Keystone Saw Works, in your last issue. This prodigality of enterprise is, it strikes me, perhaps the strongest argument against the English steel makers, and in favor of American steel, which could be submitted. Here is a firm using only American steel, made in their own works, virtually controlling the saw trade of the world, and by their success and enterprise proving the quality of their product. We must confess to a good deal of local pride in the Keystone Saw Works, and in the fact that the firm, beside the reputation of their goods, has a reputation for "great heartedness," to use the *patois* of the Brooklyn scandal, seldom found among manufacturers. All through the trouble of last winter they fed the poor of their district with a liberal hand, and actually saved hundreds from starvation. Hence no one here envies them their prosperity.

A curious ventilation was made at the last meeting of the Public Building Commission here, relative to iron beams of American *versus* foreign manufacture. It has been well known that the contract for iron used in these buildings was let to a party who supplied Belgian iron beams, at, it is alleged, thirty per cent. less than American can be furnished at. A resolution was offered at the meeting that all iron used should be of American manufacture, and notifying the architect to invite proposals accordingly. This brought out the statement that there were but four manufacturers of rolled beams in the country, and the accusation that they had combined to put up the price of the article. Ultimately the resolution was modified to invite proposals for beams of American manufacture, and to use only American iron, *if it is furnished as low, or nearly as low, as foreign iron*, which simply means nothing. The mills which roll iron beams in this country are the Phœnix Iron Co., of Phœnixville, Pa.; the Union Iron Mills, Carnegie, Kloman & Co., of Pittsburgh; the Union Iron Co. (late Wadsworth Iron Co.), of Buffalo; and the New Jersey Steel and Iron Co., at Trenton, Cooper, Hewitt & Co., New York. These form what was called, in the meeting referred to, "the combination to put prices up." Outside of these there is, however, another mill which rolls beams, viz., the Passaic Iron Co., of Paterson, N. J., Watts Cooke, superintendent, and of which the well known commission merchants of your city, Messrs. A. R. Whitney & Bro., are agents. This firm secured the beams, 200 tons or thereabouts, for one floor of the State Capitol at Albany, lately, and also the beams for the Centennial buildings, at prices, it is said, considerably under those of the combination. Two of the great iron companies, above referred to, have bridge companies directly connected with them, and hence, no doubt, find their account in using their iron for such purposes. It is not to be supposed that American iron beams can be furnished as low as Belgian, the latter being made by the very cheapest labor and coal of Europe, and the Belgians to-day underselling the English mills in their own market; but it is certainly an anomaly that in Pennsylvania—yea, in Pig Iron Kelley's own district (I use the title rather in respect than as it was given) foreign iron beams should be used in city buildings. Nevertheless, the success of the Passaic Co., and the rapidly increasing demand for iron in building, suggests the idea that several of our idle rail mills might turn their attention to I and deck beams with advantage and profit. The same public buildings have given a considerable impetus to the use of labor saving machinery. The contractors for the marble, Messrs. Struthers & Sons, have just finished an extensive range of works for cutting the stone, supplied with a locomotive crane, or derrick, much of the type of the well-known French "*grue roulante*." This derrick travels on an elevated railway leading from the wharf over the shops and to the street beyond the yard. In the shops, over each set of "bankers" where the stone is cut, openings are made in the roof, and by means of the traveling crane, a ten ton stone can be swung out of the hold of the ship at the wharf and deposited through the opening in the roof directly before the workmen, or a finished stone lifted out of the shops through the roof and loaded on the "gondolas," or stone wagons in the street. New machinery for sawing marble has also been added, among which are frames capable of sawing stone 18 feet long and 9 feet wide.

At the Centennial grounds every advantage is also taken to use power against labor. The Pennsylvania Company has run a track into the grounds, which the contractor, Mr. Dobbins, has continued through the center, and will add it around the sides, of the Memorial Building. Between the outside tracks and the wall will be a 16-foot track, on which will travel a locomotive steam derrick, of the style introduced and used by Mr. John Bridgford, at the State capitol in Albany. By this means all heavy stone and other material can be lifted from the cars and placed *in situ* in the building without human aid beyond the direction of the engine. Thus inventive genius, otherwise called common sense, comes to the aid of man in accomplishing large undertakings.

I accept with pleasure the correction of the Wyandotte *Courier*, relative to the first steel steam vessel built, and trust that Messrs. Kirby & Bros. may continue their good work until the carrying trade of the great lakes may be entirely done in steel bottoms. Low priced, or fair priced steel plate, solid and homogeneous, is all that is wanted to insure this, and a new process, simple, cheap and practical, of producing a steel ingot of any size capable of being rolled, free from porosity, and at a cost little over that of pig metal, and lately invented, will enable the production of such plates very soon. John Roach has lately turned out from his Chester yard another new iron collier for the Reading Company, which is of the size and style of the others hitherto described. He has also contracts for three first-class iron steamers for the Pacific Mail Company, each to cost $600,000, and $100,000 for outfit, or $2,100,000 for the three, to have one-half more power than the Colima, and to be finished in three months. So we slowly improve.

Casting Brass.

When brass is ready to be poured, the zinc on the surface begins to waste with a lambent flame. When this condition is observed, the large cokes are first removed from the mouth of the pot, and a long pair of crucible tongs are thrust down beside the same to embrace it securely, after which a coupler is dropped upon the handles of the tongs; the pot is now lifted out with both hands and carried to the skimming place, where the loose dross is skimmed off with an iron rod, and the pot is rested upon the spill-trough, against or upon which the flasks are arranged.

The temperature at which the metal is poured must be proportioned to the magnitude of the work; thus large, straggling, and thin castings require the metal to be very hot, otherwise it will be chilled from coming in contact with the extended surface of sand before having entirely filled the mold; thick massive castings, if filled with such hot metal, would be sand-burned, as the long continuance of the heat would destroy the face of the mold before the metal would be solidified.

The line of policy seems therefore to be, to pour the metals at that period when they shall be sufficiently fluid to fill the molds perfectly and produce distinct and sharp impressions, but that the metal shall become externally congealed as soon as possible afterward.

For slight molds the carbonaceous facings, whether meal-dust-charcoal, or soot, are good, as these substances are bad conductors of heat, and rather aid than otherwise by their ignition; it is also proper to stir these molds for thin works, or slightly warm them before a grate containing a coke fire. But in massive works these precautions are less required; and the facing of common brick-dust, which is incombustible and more binding, succeeds better.

The founder therefore fills the molds having the slightest works first, and gradually proceeds to the heaviest; if needful he will wait a little to cool the metal, or will effect the same purpose by stirring it with one of the ridges or waste runners, which, thereby, becomes partially melted. He judges of the temperature of the melted brass principally by the eye, as when out of the furnace and the very hot surface emits a brilliant bluish white flame, and gives off clouds of the white oxide of zinc, a considerable portion of which floats in the air like snow, the light decreases with the temperature, and but little zinc is then fumed away.

Gun metal and pot metal do not flare away in the manner of brass, the tin and lead being far less volatile than zinc; neither should they be poured so hot or fluid as yellow brass, or they will become sand burned in a greater degree, or rather the tin and lead will strike to the surface. Gun metal and the much used alloys of copper, tin and zinc, are sometimes mixed at the time of pouring; the alloy of lead and copper is never so treated, but always contains old metal, and copper is seldom cast alone, but a trifling portion of zinc is added to it, otherwise the work becomes nearly full of little air bubbles throughout its surface.

When the founder is in doubt as to the quality of the metal, from its containing old metal of unknown character, or that he desires to be very exact, he will either pour a sample from the pot into an ingot mold, or extract a little with a long rod terminating in a spoon heated to redness. The lump is cooled and tried with the file, saw, hammer or drill, to learn its quality.

The engraved cylinders for calico printing are required to be of pure copper, and their unsoundness, when cast in the usual way, was found to be so serious an evil that it gave rise to casting the metal under pressure.

Some persons judge of the heat proper for pouring by applying the skimmer to the surface of the metal; which, when very hot, has a motion like that of boiling water; this dies away and becomes more languid as the metal cools. Many works are spoiled from being poured too hot, and the management of the heat is much more difficult when the quantity of metal is small.

In pouring the metal care should be taken to keep back the dross from the lip of the melting pot. A crucible containing the general quantity of 40 or 50 lbs. of metal can be very conveniently managed by one individual, but for larger quantities, sometimes amounting to one hundred weight, an assistant aids in supporting the crucible, by catching hold of the shoulder of the tongs with a grunter, an iron rod bent like a hook.

Whilst the mold is being filled, there is a rushing or hissing sound from the flow of the metal and the escape of the air; the effect is less violent where there are two or more passages, as in heavy pieces, and then the jet can be kept entirely full, which is desirable. Immediately after the mold is filled, there are generally small but harmless explosions of the gases, which escapes through the seams of the mold; they ignite from the runners, and burn quietly; but when the metal blows, from the after escape of any confined air, it makes a gurgling, bubbling noise, like the boiling of water, but much louder, and it will sometimes throw the fluid metal out of the runner in three or four separate spirts; this effect, which mostly spoils the castings, is much the most likely to occur with cored works, and with such as are rammed in less judiciously hard, without being, like the molds for fine castings, subsequently well dried. The molds are generally opened before the castings are cold, and the founder's duty is ended when he has sawn off the ingates or ridges, and filed away the ragged edges where the metal has entered the seams of the mold; small works are additionally cleaned in a rumble, or revolving cask, where they soon scrub each other clean.

Nearly all small brass works are poured vertically, and the runners must be proportioned to the size of the castings, that they may serve to fill the mold quickly, and supply at the top a mass of still fluid metal, to serve as a head or pressure for compressing that which is beneath, to increase the density and soundness of the casting. Most large works in brass, and the greater part of those in iron, are molded and poured horizontally.

The casting of figures is the most complex and difficult branch of the founder's art. An example of this is found in the molding of their ornaments in relief. The ornament, whatever it may be—a monumental bas relief, for instance—is first modeled in relief, in clay or wax, upon a flat surface. A sand flask is then placed upon the board over the model and well rammed with sand, which thus takes the impress of the model on its lower surface. A second flask is now laid on the sunken impression, and also filled with sand, in order to take the relief impression from it. This is generally termed the cope, or back mold. The thickness of the intended cast is then determined by placing an edging of clay around the lower flask, upon which edging the upper one rests, thus keeping the two surfaces at the precise distance from each other that it is intended the thickness of the casting shall be.

In this process the metal is economized to the greatest possible extent, as the interior surface, or back of the casting, is an exact representation of the relief of the subject, and the whole is thus made as thin in every part as the strength of the metal permits.

Several modifications of the process just described are also made use of, to suit the particular circumstances of the case. What we have said, however, is a detail of the principle pursued in all matters of a similar nature. In conclusion, we will give a composition for cores that may be required for difficult jobs, where it would be extremely expensive to make a core-box for the same:

Make a pattern (of any material that will stand moulding from) like unto the core required. Take a mold from the same in the sand, in the ordinary way, place strengthening wires from point to point, centrally; gate and close your flask. Then make a composition of two parts brick-dust, and one part plaster of Paris, mix with water and cast. Take it out when set, dry it, and place it in your mold warm, so that there may be no cold air in it. We shall speak more specifically of figure casting in the next and concluding article of this series.

A New Wilmington Built Steamer.—The new steamship Hudson, which recently arrived at this port from Wilmington, Del., is one of the finest specimens of American shipbuilding ever seen in New York. She was built by Pusey, Jones & Co., of Wilmington, and will ply between this port and New Orleans on the Cromwell line. The new steamer is built of iron, is 300 feet long on deck, has 34 feet breadth of beam, and 25 feet 9 inches depth of hold. She is double decked and schooner rigged. She is furnished with a vertical condensing engine, the cylinder being 48 inches in diameter, and the piston having a 72 inch stroke. There are four return tubular boilers, each having 3 furnaces. The boilers are 14 feet long and 9 feet in diameter. The propeller has blades of gun metal, and is 15 feet in diameter. The new steamer is divided by bulkheads into 5 water-tight compartments. The requirements of passengers have been foreseen and provided for in the construction of the new vessel. On the main deck are 24 state-rooms, of which the walls and ceilings are neatly painted. The trimmings are of black walnut. The windows are of plate glass and are hung with lace curtains. Brussels carpets cover the floor, and handsome and comfortable lounges, covered with crimson plush, are ranged along the side. The ladies' saloon is tasteful and luxurious. The walls are painted in pearl, with blue panels and gilt molding. Handsome carpets cover the floor, and lounges of black walnut, covered with crimson plush and decorated with gilding, are found on every side. Graceful chandeliers hang from the ceiling, and give to the apartment, when lighted, a brilliant appearance. The dining saloon is furnished in a manner similar to the ladies' saloon. It has four tables, and will seat 50 passengers. On the promenade deck are the pilot house, the captain's room, and a small cabin for passengers. The equipment of the Hudson is first-class in every particular, and she has attracted much attention since her arrival a few days ago. The new vessel made her trial trip on Tuesday, and will sail for New Orleans on Saturday, Aug. 15. She is commanded by Capt. E. V. Gager.

The Virgo Iron Company, of Terre Haute, Ind., were organized in 1869, with a capital of $125,000, and theirs is one of the leading industries of that city. Commencing with one stack of 25 tons capacity, they were soon compelled to build another, of the same size as the first, 52 feet high, 12 feet bosh, with hot blast. They use Brazil coal, and Missouri, Simmons Mountain and Iron Mountain ore. The works are admirably located for shipping purposes, being situated on the line of the Evansville & Crawfordsville Railroad, connecting with every point. At present only one stack is in blast.

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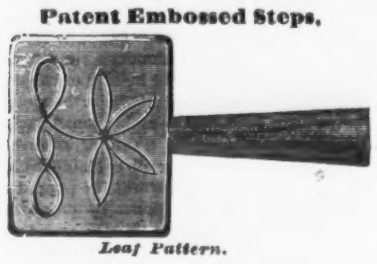
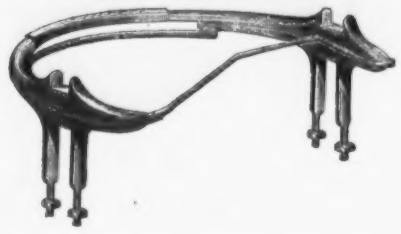
Patent Embossed Steps.



Leaf Pattern.

King Bolt Yokes.

No. 6 Fifth Wheels.

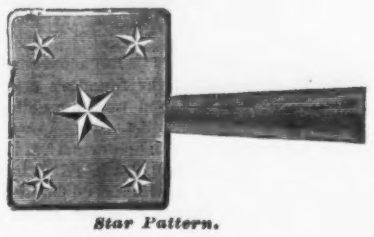


1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.

Upper View.

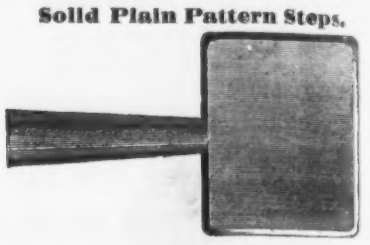
Lower View.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.

Solid Plain Pattern Steps.



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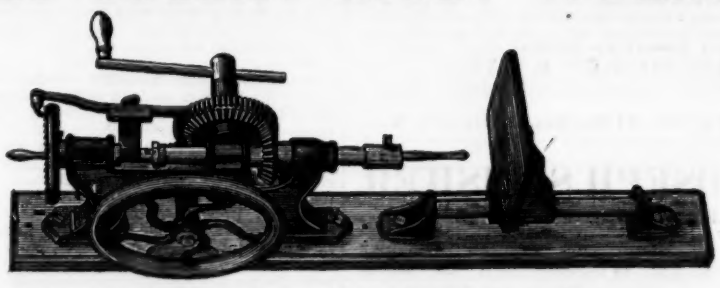

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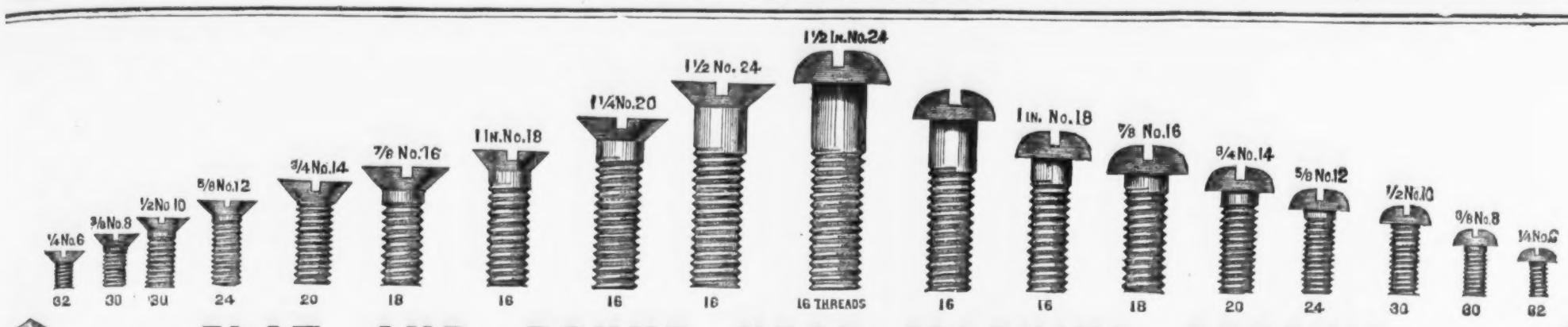

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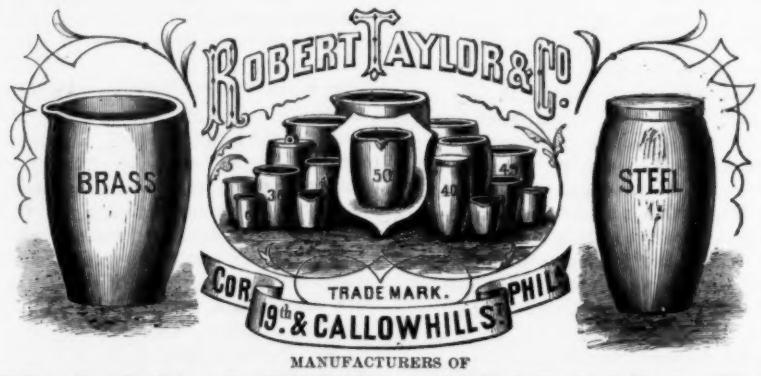

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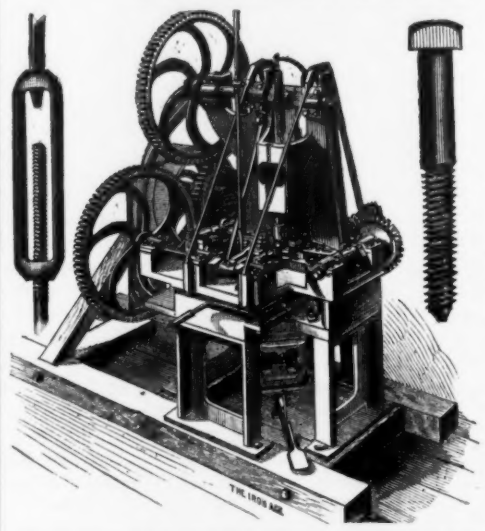

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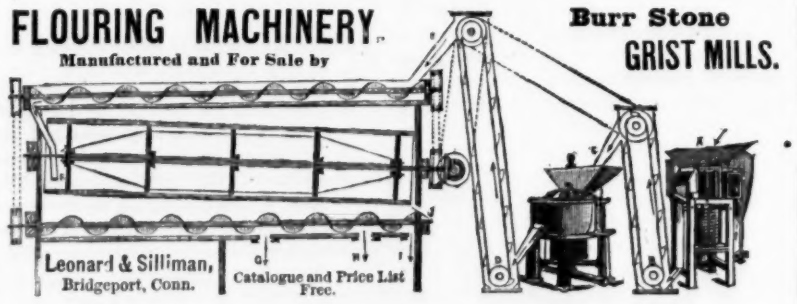

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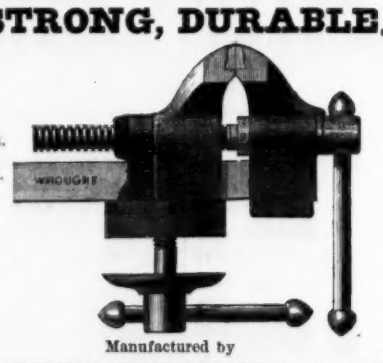

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The Discharge System.

From information received from different parts of the country respecting the relations existing between capital and labor, we conclude that the iron masters, at least, are slowly coming to the conclusion that the time has come when the question whether they or their workmen shall manage their business should be definitely settled. During the past five years the labor unions, organized under various names and for various ostensible purposes, have attained a very considerable power for mischief, which they have exercised with a reckless disregard of consequences. As the rule, these unions have assumed the form of organized conspiracies against employers, who, through lack of organization, and because of an unwillingness to co-operate for mutual protection, have been practically powerless to resist aggressions upon their rights. They have had to choose between the alternatives of submitting to such demands as might be made, or closing their works, and because of the uncertainty which has thus attended the movements of labor, employers have had to make their plans subject to the contingencies of strikes and demands for increased wages, not knowing, even in seasons of general prosperity, whether the year's balance sheet would show a profit or a loss. Beside this constant uncertainty respecting the cost of labor, employers have been subjected to a thousand nameless annoyances. Their policy of management has been challenged at every step, and in not a few instances have they been compelled to conduct their business, even to the regulation of unimportant details, as committees representing the trade unions have been pleased to direct. For years past an employer has not known whether the discharge of a workman, even for good and sufficient cause, or the employment of one whose services he might require, would be approved by the union, or whether it would bring about a strike. That they chafed under this humiliating subjugation to an irresponsible power, is not to be wondered at, nor is it a matter of surprise that they should have determined to resist the unions, and weed out of the trade, so far as possible, those who make it their business to foment discord and strife between masters and men. In some large establishments, favorably located for such an experiment, no man is now given employment who does not repudiate all affiliation with trade unions and agree not to join them so long as his name remains on the pay-roll. Where such a policy can be adopted, it is certainly the best and most effective way of guarding against conspiracies. Other companies have adopted what is generally known as the "discharge system," which is more likely to become general than the other. This system consists in the adoption of a rule to the effect that any man who shall actively engage in a conspiracy to deprive a manufacturer of the control of any detail of his business, or to compel him to advance wages upon the threat of a general strike, shall be promptly dismissed without any papers, and that no man shall be given employment who cannot show a clean discharge from his last place, or give a satisfactory reason for having left it. The following are the forms of discharge employed:

Present this to the General Superintendent.

CARBONTOWN IRON WORKS,
CARBONTOWN, Pa., July 29, 1874.

Issue certificate to Samuel Jones, a heater, who has left the service of the company honorably.

HENRY THOMPSON,
Manager of Finishing Mill.

Upon presenting this at the company's office the man is given the following certificate of character and capacity:

CARBONTOWN IRON WORKS,
CARBONTOWN, Pa., July 29, 1874.

To all whom it may concern: This is to certify that Samuel Jones has been employed for two years past as a heater, by the Carbontown Iron Company, and that he is a competent and meritorious workman.

RICHARD DUNN,
General Superintendent.

The rail mills generally have adopted this system, and say it works satisfactorily. Several of the largest bar mills are also working under it, and others promise to adopt it. Of the two systems, the latter probably admits of more general application. It furnishes the unions no *causus belli*, for men who leave a shop after receiving notice that they will not be given discharges, do so voluntarily, and the unions could not give an employer trouble for not employing men who did not come well recommended. The result of either system would be to break up the unions, and protect both masters and men against a further tyrannical exercise of their power for evil. All that is necessary is that a fair proportion of employers in a trade should agree to adopt one system or the other, and then keep faith with each other. If the men discharged for cause from one shop can go to another close at hand and find employment; or if, when a manufacturer is engaged in a struggle with the union to which his men belong, upon some point or question of interest to all employers, his neighbors take advantage of the opportunity to secure his best workmen and profit by his misfortunes, all efforts to defend the rights of capital will fail, and we shall have a worse state of affairs in the labor market of this country than has ever existed in England. The welfare of both masters and men, and the prosperity and progress of the country, demand that our industries shall be emancipated from trade union control, and those employers who, in the greed of present gain, hold aloof from the struggle, ready to share the benefits gained or to escape the cost of failure, will have only themselves to blame if the monster they have permitted to grow shall turn and rend them.

Long ago we reached the conclusion that to argue questions of principle or policy with the newspapers published in the interests of the labor unions, was only to furnish an illustration of what has been called the hydrostatic paradox of controversy; but as there are many intelligent workingmen among our readers, who may infer from our outspoken hostility to the trade unions that we are hostile to the efforts of the laboring classes to better their condition, we think it right and proper to remind them of a few facts of which they are seemingly ignorant, but a knowledge of which might enable them to better understand the true relations existing between themselves and their employers. As the rule, workingmen have a very erroneous idea of the profits of manufacturing. They seem to think that a man or company owning a well appointed mill, workshop or factory, which is not allowed to stand idle any considerable part of the time, must be reaping a golden harvest of profit. Sometimes this idea is correct, oftener it is not. The percentage of manufacturers who succeed in laying up a comfortable competence to support themselves and their dependents, is very small indeed. We believe the proportion is not greater than one in forty, taking the average of manufacturers, large and small, in all trades. In the iron trades it is probably very much larger, for the business is one which requires considerable capital, and the masters are thus better able to tide over times like these, by offsetting the losses of one season by the profits accumulated in more prosperous times. Now, it is of this we wish to speak specifically. When business is very dull and employers are losing money, the workmen are usually willing to work for such wages as they can get, which are always as large as the masters can afford to pay, and often larger. But as soon as business revives and the masters begin to make a profit, they consider that they have a right to a share of that profit and, under the name of trade unions, they organize conspiracies to get it. Suppose the employer grants the request and shares his profit: Of course, he can accumulate but little to reinforce his capital. When dull times return he has nothing to draw upon. His capital is locked up in buildings, machinery, tools, etc., and current earnings do not pay current expenses. In such a case, he must borrow money or fail, and if he succeeds in getting ready money, the note which he gives for it is a mortgage upon his future prosperity, which will render it impossible for him to either lay aside any considerable part of the profits of his business in the immediate future, or to share them with his workmen. This is the position of four-fifths of the manufactures of the country at the present time, and possibly of a much larger proportion. The workman, on the other hand, has no such responsibility. The fact that he works for another for wages is a confession that he can do better as a servant than he could as a master, and he is always at liberty to sell his services at their highest value. For a man in this position to conspire with his fellows to deprive an employer of the control of his business and to force him to adopt a policy of their dictation, when he, not they, must bear the consequences, is an outrage upon the rights of individuals which no specious reasoning can excuse or palliate. No one questions the right of a workman to leave his situation whenever it suits him to do so. If he can do better he may, if he wants to do worse no one will hinder him. He is master of his own actions, so far as this is concerned; but he has no right to organize a conspiracy against his employer, which can only lead to consequences far-reaching in their evil effects upon both capital and labor. If, by such a course of conduct, he is instrumental in forcing employers to adopt radical measures for their own protection, he will have no reason to complain if the consequences fall heavily upon himself.

Insuring Employers against Strikes.

Among the innumerable schemes set afloat during the palmy days of the South Sea Bubble, was a company organized for the assurance of employers against losses on account of dishonest servants. The same idea, which was by no means as impracticable as it might seem at first glance, has been revived and applied in a modified form in an English company for the assurance of colliery owers against losses on account of strikes. This movement is the outgrowth of the recent great strike of miners in South Yorkshire and North Derbyshire. To protect themselves against losses from like causes in future, the colliery owners have organized an association with a capital of £200,000, "to afford relief to the members subjected to losses by strikes of workmen, as well in respect of the expenses of the pits as of the failure of profits during the strike." They also propose by the new combination to assist in the settlement of all disputes between members and their workmen, and to pay expenses incident to such settlements. The articles of the Association were framed by Mr. Robert Baxter, the well-known parliamentary solicitor, who is one of the largest colliery owners in South Yorkshire.

It appears that the capital of the company is divided into £10 shares, and that a person wishing to join it shall state in writing the name of the colliery desired to be admitted, the number and names of the pits, worked, with the name and residence of the person by whom the firm is to be represented; also the total number of tons of coal raised in each pit during the previous year, and the profit per ton which it is sought to assure. These returns are to be sent to the secretary, as made up yearly to Dec. 31. Such are the preliminaries necessary to be made before a person is admitted to the benefits of the association. But before he can become a member it is required that he shall subscribe for two shares in respect of every 1000 tons of coal raised annually, and deposit a promissory note to the amount of 10 per cent. of the total sum in respect of profits assured in each year, payable to the association. Such promissory notes are to form a guarantee fund, and the board when necessary can demand their payment to meet calls or liabilities. Cash payments may be made instead of promissory notes, and the amount invested in Consols, and the interest paid to the depositor. In the appointment of directors, each firm raising 100,000 tons of coal per annum, or less, is to be entitled to one vote, with an additional one for every 100,000 tons, or any fractional part thereof in excess of the first-named quantity. In clause 11 it is stated:

"Each firm shall assure its profits at such a rate, not being less than 1/, nor exceeding 2/6 per ton, as may be agreed upon with the Finance Committee after considering the special circumstances of the colliery. The assurance payment to be made in each case by the Association in respect of profits, shall be based on the quantity of coals actually being worked at the time when the pit was put on strike or restriction, taken on the average workings during the previous three months, such average not to exceed the rate at which the colliery is assured. The contribution from each firm to all liabilities of the Association for payments ofassurance, expenses, or otherwise, shall, as to expenses, be based on the last returns of tonnage, and as to assurances be based on the amount of notes given, and calls will, from time to time as required, be made on each firm in due proportion after this rate. Each firm shall be at liberty from time to time to amend its returns of quantities being actually worked, by giving one month's previous notice in writing. Such amended returns not to extend over a less period than three months prior to the date thereof, it being the intention of this Association that each pit should be assured as closely as possible upon the actual workings."

Ample provision is made as to the mode of making out a claim for compensation for a strike or restriction, which is to be in detail, showing each item claimed for, and placed before the Finance Committee, who have power to appoint mining engineers or accountants to investigate the claim and report thereon to the Committee. But no claim for assurance or expenses is to be allowed for less than three consecutive days off work. Coke ovens connected with a colliery can be assured upon the quantity of coke manufactured at a sum to be agreed upon with the Finance Committee. Another very important rule is that relating to the rate of wages paid, advances made, or alterations in working hours, all of which, it appears, are to be subject to the approval of the board. The rule states that:

"No advance in the rate of wages payable to workmen, or concession or variation in the terms of their contracts, occasioning additional payment to them, or any advantage in the rate of wages, or an alteration in the number of their hours, shall be made or agreed to be made by any member without the previous consent of the board, except in the case of growing boys; provided that noting in this rule contained shall prevent such a modification of the wages payable, or an allowance being made to any workman in respect of any peculiar condition of a seam, or of his working place therein, as under the circumstances may be reasonable to meet the exceptional state of things; but no modification or allowance shall be made with the intention of making any advance in the general rate of wages payable to any class of workmen."

The Association takes full power to determine when there shall be resistance to the demands of the workmen leading to a strike, by which the owner shall be entitled to indemnification for expenses incurred, as well as loss of profits. The same is also the case with regard to a lock-out, for it is provided by rule 18 that—

"A lock-out shall not be determined upon unless at least a week's notice has been sent to each member that the subject will be considered at a time and place to be stated in such notice; nor if members holding one-fourth in number of votes determine against it at a meeting then held, or at some adjournment thereof. In case of such lock-out being determined upon each firm shall, from the day of the lock-out, pay all its owner's expenses. No claim shall be made on the funds of the Association for such expenses."

It further appears that no member of the Association is allowed to hold out any inducement, pecuniary or special, to any workman to enter into his service, beyond the ordinary wages paid at the colliery, nor to employ any workman on strike or lock-out at any colliery belonging to the Association. This rule, we understand, is generally adopted in British collieries, and has given rise to a great deal of trouble. There are heavy penalties for contravention of any of the rules, for it is enacted that—

"Any member of this Association acting, either by himself or his agent, in contravention of any of the rules of this Association, shall, after full inquiry made into the matter, and after the member concerned has had full opportunity of being heard, be, at the discretion of the Association, fined in a penalty not exceeding £100; and in case of continued contravention, in such daily penalty, not exceeding £50, as may be determined."

This is, in outline, the scheme of the new association, and it is understood that enough shares have already been subscribed to make it quite certain that it meets with favor in the eyes of the colliery owners. No doubt it will encounter vigorous opposition on the part of the miners, as the rules respecting labor and wages are stringent; but it is only fighting the unions with the very weapons they have employed so successfully for years. Had it not been that the workmen have maintained an assurance fund for the support of men on strike, they could not have held together and retained their power. Now that the masters have adopted the same system, the side which carries the heaviest purse will probably win the fight.

Silicon Steel.

Mr. Pepper's paper on silicon iron and steel, which appears on another page of this issue, is the first clear exposition of the extraordinary claims of this inventor which has been given to the public. This paper was read before the Franklin Institute, of Philadelphia, in May last, and a committee, with Prof. Britton as chairman, was appointed to investigate the subject and ascertain whether the inventor could accomplish in practice what he claimed to have demonstrated theoretically. For some reason—probably owing to a misunderstanding—Mr. Pepper has not yet been afforded an opportunity of meeting the committee, but he expresses a strong desire to do so, and offers to submit the process and its results to the most thorough and conclusive tests which the committee may care to undertake. A company has been formed for the manufacture of silicon steel by this process on a large scale, and then, if not sooner, the committee can have an opportunity of seeing whether it is a delusion or an important discovery. That the process is not a delusion may safely be inferred from the fact that Mr. Pepper's patent has been pirated in Belgium by a company which are now successfully engaged in the manufacture of "silicon steel," by the very process which he was the first to describe. In the interest of science the subject should be fully investigated by scientific metallurgists, and we know of none more competent to undertake the work than are the gentlemen to whom the subject was referred by the Franklin Institute.

So much for the process. As for the theory by which Mr. Pepper seeks to account for the results reached, we can only say that if he had contented himself with stating the simple facts without attempting to explain them scientifically, he would have probably had less difficulty in securing a recognition of his claims among scientific metallurgists. When the fact was fairly established the reason might have been sought, and probably found. In Mr. Pepper's paper there is much to invite adverse criticism, and some of his statements are liable to encounter flat and unqualified contradiction at the outset. This, however, is a matter of but little consequence. It makes practically no difference whether Mr. Pepper's theory is right or wrong. The question is, can iron be converted into steel of high quality by his process? If this question can be conclusively answered in the affirmative, the discovery is one which promises very important results. Mr. Pepper asserts that it can, and that he has done it frequently, and is prepared to do it again at any time and on any scale. From such samples as we have seen of what he calls silicon iron and steel, we are satisfied that the process is one promising results which would justify its trial on a commercial scale. When its practical value is determined, it will be time enough to quarrel with his theory.

We publish in another column an article on direct processes for the reduction of iron from the natural oxides, by Mr. Charles M. Dupuy, which merits attention. We have not witnessed the workings of his process, nor are we familiar with the results of his experiments, extending, as they have, over a considerable period: but he treats the subject fairly and intelligently, and the conclusions he reaches are said to be fully borne out by the "logic of facts."

Blast Furnace Construction.

BY THOMAS M. DROWN.

Notwithstanding the progress that has been made in recent years in solving many problems in iron metallurgy, we fail to discover, to any considerable extent, the application of the results of scientific investigation in practice. This is due, perhaps, not so much to indifference on the part of iron masters as to their inability to see, in many of the experiments of Bell and others, any practical bearing. The only point of interest in these investigations to the pig iron makers is to learn how to diminish the cost of production, or, in other words, how to make a ton of iron with less fuel, and in the absence of handy rules or simple formulæ for this purpose in the results of experimenters,

their work is supposed to have a theoretical interest only. A little reflection will, however, show that most of the chemical investigations into the properties of gases, ores, fuels etc., bear immediately on the question of the economic production of iron. The blast furnace process consists, as is well known, in the gradual reduction of the ore as it descends the shaft of the furnace by the carbonic oxide generated by the combustion of the fuel. When the reduced ore—i. e. the metallic iron—reaches the fusing zone in a short distance above the tuyeres it melts, the earthy matters separating at the same time from the metal as fluid slag. The fuel burnt before the tuyeres has but this one duty, namely, *fusion*, and is in a properly conducted furnace process only present in amount sufficient for this purpose—leaving out of consideration the small amount of carbon absorbed by the iron—the work of reduction being effected entirely by the gases. Should this fuel have added to its duty of fusion that of reduction, as where unreduced ore reaches this zone, the result would be a lowering of the temperature of the hearth, followed by the production of a harder iron and darker slags, and, in extreme cases, as where slips occur, in the complete chilling of the furnace. The same effect is produced, rather paradoxically, by increasing the amount of blast. Blowing a fire out is a simple matter where the blast is applied above, but increasing the amount of air below the fuel, as in a shaft furnace, can only have the effect of increasing the rapidity of combustion and raising the temperature. This is what in reality takes place in a blast furnace when the blast is increased, and the result of the augmented temperature is, in the first instance, more active fusion and a more rapid descent of the charges; but as unreduced ore is thus brought into the fusing zone, cooling is produced as a secondary effect. A furnace process may be so conducted that the ore regularly reaches the hearth imperfectly reduced. In this case there must be an amount of fuel present sufficient, not only to fuse, but also to complete the work of reduction. A process of this character is necessarily a wasteful one, a large amount of heat being carried off in the gases, both as sensible heat and potentially as carbonic oxide. But how are we to determine whether a furnace is working normally or with the minimum of fuel? Direct examination of the stock in the furnace is not practicable, and experimental determinations of the changes that the ore undergoes as it descends the shaft, are liable to many sources of error. The question is answered practically, but to an imperfect degree, by comparison of the amount of fuel used by different furnaces; but arguments, based on such comparisons, are often fallacious, owing to differences of ores and fuels employed. Still, it not unfrequently occurs that of two furnaces working the same ore with the same fuel, one will use much less fuel than the other to produce a given amount of iron. The cause must here reside in differences in the construction or management of the furnaces, and it is the object of the present paper to suggest how some of the results of recent investigations may be applied to the subject of furnace construction.

In the first place, let us inquire what may be experimentally determined in any case of iron smelting. We will suppose that a given ore deposit is to be the object of treatment. The chemical analysis of the ore informs us of the amount and quality of the iron that can be produced from it, and of the amount and character of the earthy matters to be fluxed off. At this point investigations have always, heretofore, stopped, if indeed they have been carried so far. There are, however, important properties based on the molecular construction of the ore that are scarcely less important to be known than its chemical composition. The rate at which an oxide of iron is reduced is dependent principally, if not entirely, on its physical constitution. This can be readily determined by exposing the ore at different temperatures to the action of carbonic oxide, and to mixtures of this gas in varying proportions with carbonic acid and nitrogen. The results of these investigations would be expressed conveniently on a numerical scale previously established by determinations made on characteristic and well known ores, say, for instance, the magnetites of New Jersey and Lake Champlain, and the hematites of Lake Superior and Iron Mountain. The proper hight of furnace for smelting any number of the series thus established could readily be determined by a few tentative experiments, if, indeed, there are not sufficient data already at hand to settle the point. The hight of stack corresponding to the other numbers of the series could be estimated with approximate accuracy. There is a greater difference in the susceptibility of ores to reduction than was generally supposed before the publication of Bell's researches. To build a high furnace for the treatment of ores of ready reducibility is not only to waste money in construction, but also to favor irregularity of working of the furnace; while, on the other hand, to employ a low furnace for refractory ores is to waste fuel, for in this latter case either the susceptibility to reduction must be increased by raising the heat of the furnace, and the preponderance of carbonic oxide in the gases, or the final stages of reduction must be at the expense of the fuel in the hearth. Viewed solely from a theoretical standpoint, it is clearly a mistake to use ores of different degrees of reducibility in the same charge, for waste of fuel must, in such cases, necessarily result, either by uselessly prolonging the time that one ore remains in the furnace, or by allowing insufficient time for the reduction of another. Local conditions may, it is true, render the practice necessary and even advantageous, in view of the quality and quantity of the iron and cinder produced, but apart from this there is a prevalent notion among iron masters that there is luck in mixtures, and that one ore may assist in the reduction of another. It was long asserted that an admixture of brown hematites was essential to the smelting of heavy, dense magnetic ores—a notion far from obsolete at present; but practice has shown that, even with charcoal as fuel, compact magnetites can be smelted alone in a furnace with perfect regularity. The economic advantage of smelting ores of ready reducibility is sufficiently great to direct attention to the advisability of calcining all ores before charging in the furnace. It is, in many cases, more than probable that a direct saving in the cost of production would result, but direct experiment can alone decide the point in any given instance.

Heating the blast and increasing the hight of the furnace, have the same effect in lessening the consumption of fuel, and for the same reason, namely, the more complete utilization of the reducing power of the gases in the furnace. In both cases the contact of the ore and gases is prolonged, the heated blast being accompanied by diminished bulk of gases, and the hightened stack by longer passage in the furnace. On this point, viz., the greatest possible utilization of the carbonic oxide in the furnace, rests the whole question of economy of fuel. There is no necessity at the present day to urge iron manufacturers to raise their furnaces or increase the temperature of the blast, for the tendency is strong enough in that direction already, but there is a point in furnace construction, immediately connected with economy of working, which has received but little intelligent and thoughtful consideration, and that is, the influence of the outline of the interior of the furnace, on the interception and complete utilization of the carbonic oxide. It is singular that, notwithstanding the great amount of minute study that has been given to furnace construction during the present century, that no principles of construction, of any value, have been established for the proper profile of the interior, except that in general it is well to avoid all sharp and abrupt changes of outline. Assuming, as we have done, that the main object in furnace management is to favor the intimate and prolonged contact of ores and gases, how can this be promoted by the construction of the furnace? Obviously by widening the stack so as to diminish the rapidity of the upward current. The correctness of this view has been well born out in practice. Furnaces with high boshes and wide mouths have been found, in almost all cases, to work more favorably as regards consumption of fuel than the older furnaces where the opposite conditions exist. It is probable that we have not yet reached the profitable limit of economy in this direction, and that we may ultimately come to build furnaces in the form of an inverted, slightly truncated cone. This form would further have the advantage of securing a regular descent of the charge, whereby all the ore would come equally under the influence of the reducing gases. Where this regularity of descent and contact do not exist, an excessive use of fuel is always the result. The importance of careful and intelligent charging is too well appreciated to need comment here, but it may not be amiss to point out that the construction of the furnace may go far to neutralize the effect of judicious charging. The inclination which would give the best results in a conical furnace would have to be experimentally determined, but, in general, it should correspond to the diminution of the bulk of the charge in its descent, and, as this diminution of bulk does not begin until the charge has sunk a short distance, the upper part of the shaft would appropriately have the form of a cylinder. That there might be difficulties in building or charging a furnace of the form proposed is admitted, but they would probably not prove to be insurmountable. Whether the practical working of such a furnace would justify the theoretical speculations experiment alone can decide.

Direct Processes.

BY CHARLES M. DUPUY, C. E.

The great wealth of magnetic ores in this country is exceptional throughout the world. While they are of surpassing richness—almost pure iron—we work them into metal at a high cost for labor, and at a great waste of fuel and ore.

Fredrick Overman, in his little work on steel, says we want purer iron. "The immense ore beds of New York, New Jersey, Missouri and Wisconsin, as well as of other States, are unsurpassed in purity, and should produce iron equal to the best Swedish, and at a much cheaper rate than it can be imported. Ours, he says, are peculiar conditions, and resemble those of no other people. We should not copy the processes of other nations, but work out our own method in our own way."

It is curious to note the slow development of any art, more particularly the manufacture of iron, surrounded as it is with so many real difficulties, and hedged about by so many firmly rooted prejudices. The elder Mushet—the father of iron experimentalists—observed the wastefulness of its manufacture, and spent his long and useful life in the improvement of iron. Among various other experiments, as early as 1794, he mingled ore and carbon in a crucible, and subjected it to a heat which reduced the ore and welded its particles together. At the same heat, after breaking the crucible, he was delighted to be able to hammer its contents into a solid bar of iron. Here was the real starting point of all the direct processes. Since that period, up to the present time, crucibles, chambers or retorts of various sizes and shapes, heated from the outside, have been devised and tested for reducing iron ores. These containing vessels must necessarily be of considerable thickness, to withstand, for a single operation, a heat sufficent to penetrate from the outside the few inches of ore and carbon lying dormant within them. A heat energetic enough to produce a thorough deoxidation in a reasonable time, practically, is too destructive and costly of crucibles to be made profitable. To prevent this damage, a moderate temperature, reaching over a longer period, has been tested, but a moderate heat only partially deoxidizes the ore, and it requires a high temperature to accomplish deoxidation thoroughly, and with sufficient energy. Beside this, the newly made metal is left in a porous, spungy condition, and is peculiarly sensitive to the furnace gases. It will receive a varnish of fresh oxygen over the innumerable little surfaces of its cells or pores or fibres the moment it is cooled and penetrated by the pressure of the atmosphere, just as every bar of iron, after cooling, receives a scale of oxygen on its surface.

To prevent this attack of the atmosphere, the hot, spongy iron, without external exposure, was at once dropped into the balling or reverberatory furnace. Still the waste proved excessive. This may be satisfactorily explained. While a portion of the oxygen, thrown into the furnace, unites with the carbon to supply a welding heat, another portion penetrates to the infinitesimal surfaces of the pores or fibers of spongy metal, and these combined surfaces, so oxidized, are of such large extent as to cause great waste.

The aim, then, was to close these pores, so as to prevent the penetration of furnace gases, by pressing the cooled sponge into blooms with hydraulic power, previous to the second heat. If the ore could have been thoroughly deoxidized at first, by the application of sufficient heat around the crucible, and if the surfaces of the pores had not been varnished with oxygen, on exposure to the atmosphere, as explained, this step might have been successful, but the small yield and rich cinder still pointed to a defect.

We may pass by all that class of processes for working ores to metal at one operation, on a series of tables or shelves, in a reverberatory furnace. The most prominent of this class is Harvey's process, on which large sums were fruitlessly expended for a number of years. They have not been successful, because the oxygen of the furnace is quite as ready to penetrate the cells of the partially reduced ore as it is to unite with carbon to support combustion. For a like reason all furnaces, either rotating or fixed, with the flame passing through them, and coming in contact with the ore, cannot be the most effective.

For a time there was a process which was thought to promise success, because the deleterious furnace gases were excluded throughout the operation. The ore was packed with carbon, in alternate layers in a steel converting furnace, to the extent of 40 or 50 tons, and gradually heated from the outside, up to the welding point. In a couple of weeks the metal, thoroughly reduced and consolidated, was removed in a cool state to the balling furnace. The maintenance of this converting furnace up to a high heat for repeated operations would of itself have defeated this process, had there not been a more serious difficulty. The ore, it is true, was thoroughly reduced, but was more or less carbonized, up to the condition of cast iron, and the process was too expensive for the manufacture of pig iron.

In following out these various devices, they were thought to be fairly based for success on the exact results from covered crucible in the laboratory, and in keeping with the blast furnace and forge fire operations. In the laboratory, the heat applied outside of the closed crucible brings all the metal either to cast or wrought iron, at pleasure, by properly proportioning the carbon, because no external oxygen can interfere. Deep down and between the thick walls of the blast furnace crucible all atmosphere is excluded, and the large excess of carbon it contains thoroughly decomposes the oxygen of the blast. In it the high heat required for perfect deoxidization is maintained, and the metal, saturated to a high degree with carbon by the powerful blast pressure, is nearly all saved as a carburet or pig iron. The shallow forge fire, with a light blast, certainly produces wrought iron in a few hours, but with great waste of fuel and ore, which is accounted for by the penetration of the atmosphere.

Experience proves that it is clearly impossible to impart sufficient heat from the outside of a chamber or crucible to accomplish practically, on a large working scale, the results reached by laboratory experiments in the chemist's crucible. Nor can a high column of ore be uniformly penetrated by a blast of reducing gases forced through the mass. As in the "Stuck" or "Wulf's" oven, the blast pressure necessary to penetrate the column of ore, at every operation, will produce a mixture of cast iron, steel and wrought iron, of grades varying from the base upward. A low column of ore will have the atmospheric objections of the forge fire. It is, further, impossible to maintain a welding heat in the reverberatory furnace without having the delicate fibres of partially reduced ore largly destroyed by the deleterious gases to which they will be exposed.

To ensure an economical, direct method, the operation must not pause with the production of spongy iron. As in the chemist's closed crucible, or in the blast furnace or forge fire, the process must go on with a continuously increasing heat, until the cells and fibers, produced by the withdrawal of oxygen from the ore, are compressed together and solidified into a cake, at the pasty condition of the metal. It is then a commercial product of wrought iron, either hammered or otherwise.

How shall this be accomplished? Some years since the writer suggested that rich ores, mingled with the proper proportion of carbon for reduction, should be placed in thin sheet iron cases, of size most convenient to handle, and that many of these, to the extent of several tons, placed in a simple, cheap furnace, of his device, in a few hours would become caked and solidified to wrought iron without further labor, while the encasement would be preserved to the end, the whole to be hammered into a bloom or bar at the same heat.

The sheet iron canister or crucible will cost from $5 to $6 to the ton of iron produced. It is a convenient, portable package, keeping the particles of ore in close contact with the exact proportion of carbon required for reduction. It allows the heat to penetrate readily on all sides. It is homogeneous with the new metal, and welds up with it, under the hammer. Above all, as it shields and protects the ore from the blast and furnace gases during the whole operation of deoxidation and consolidation, the metal is of superior quality, and is nearly all saved. A series of experiments, extending over many years, confirms the writer in the belief that this process solves the problem of the manufacture of wrought iron direct from the natural oxides, on any scale of magnitude and at a cost which will effect a great saving over the indirect method. The results of these experiments, in the form of samples of metal taken at all stages of the process, are open to the inspection of any one interested in this subject.

No. 4102 Spruce street, Philadelphia.

An Unknown Quantity Demonstrated.

The Cambria iron masters are now reaping the reward of firmness and pluck. In no other way could they have demonstrated their ability to conduct their own business so well as they have done by successful resistance to the arbitrary interference of irresponsible outside parties. But, as usual, the punishment falls upon the comparatively innocent. One-quarter of a year deducted from the producing power of labor is no trifling loss to the workingman. And it is a loss to be deplored, because it is a dead loss, and cannot be retrieved in a lifetime. Had it been incurred battling for a principle the case would present a more favorable aspect. But it was not so incurred. The only principle involved was that which underlies all successful business operations, and it was in antagonism to this principle that the late strike was conceived and carried on. Take from men the right to conduct their business affairs in the way that seems most judicious, and a palsy would prostrate every enterprise requiring large means to carry it on.

In all this clamor about monopoly it is generally forgotten that capital, or cash, does not monopolize monoply. The trades unions, ostensibly and ostentatiously set up to protect the workingmen, are really nothing better or more than combinations entered into to monopolize the producing power of labor. The industrial world may be separated into two classes, buyers and sellers. The seller may undoubtedly set the price that pleases him upon his wares, whatever they may be; and sometimes he may be able to compel the buyer to pay that price. But as a rule there must be two parties to all business transactions. Unless there be some degree of comity between the two classes trade inevitably languishes. If the rupture be serious trade reaches a stand-still. The Cambria operatives had labor to sell, and the Cambria iron masters offered to purchase at a rate that could not, under the stagnation then prevailing, return them a profit on the purchase. They desired to give employment when employment was a scarce article, however. The demand for iron had fallen off largely. The demand for labor fell off in like proportion. But the union seized upon that decidedly unpropitious time to put up the price of the latter article. If we look in a common-sense way at the length and breadth of this affair its absurdity and unbusiness like aspect become very apparent.

The demand for iron had largely fallen off, in fact almost ceased altogether. The Cambria Company had a stock on hand, and had proposed to increase that stock by giving employment to a large number of persons. Suppose now that the company had refused to sell their stock save at a considerable advance on the price in prosperous times. They could have fixed their terms to suit themselves, of course; but, on the other hand, the buyer class would have refused to pay that price. Thus trade would have ceased altogether, because, under the circumstances, buyers would not submit to the terms. Having some common sense, as well as cash, the Cambria Company did nothing so violative of a well understood law of trade. In the stagnation of business prices fell off, the price of iron being no exception. The company saw they must lose, bearing their proportion of the general loss. Instead of arraying themselves against the law they prepared to obey it, shouldering the loss as best they might. In other words, the company held by business principles.

On the other hand, the men who had a stock of labor to sell, being ill-advised by turbulent persons who seem to have invested their common sense, if they ever had any, where they cannot realize on it, ignored the fact of stagnation and the correlative fact of a decline in prices, and refused to sell at market prices. They must have been aware that it was not for the interest of the company to increase its stock at that time, and that it could not reasonably hope to make whatever labor it might purchase a source of profit. Yet in full view of this fact the operatives adhered to their demand. If unreasoning obstinacy be an unknown quantity, we conclude that the Cambria operatives have demonstrated it to the full. They refused to sell what they had to sell, and for which there was only an accommodation demand, insisting that men who had invested a few millions in a business enterprise should conduct that enterprise not as their judgment dictated, but under the dictation of persons who know less of the laws of trade than they do of the composition of comets or of the nebulæ in Orion. When persons set up a claim to dictate the conduct of business in which they have invested nothing, and with which they have and can have nothing to do, they ought at the very least to back their claim with some intelligence as respects the laws of trade. They cannot expect men of real ability to receive their counsel, much less to submit to their dictation. No enterprise in the country can be carried on profitably, or with even remote expectation of profit, by such persons. They may, indeed, be relied on to pull down any business not strongly backed by cash and conducted with sagacity. They have never shown any higher order of ability in this country. They may be assisting to solve the labor problem, but they go the same way about it that the South did to vindicate the righteousness of slavery. The result will be similar. The intelligent workingmen of this country will some day emancipate themselves from bondage to these foreign agitators, who seem to have been caught in the whirl of a retrogressive revolution as they lay in their cradles, and become so confused that they continually mistake reaction for progress.—*North American.*

The Occlusion of Hydrogen in Iron.

To the Editor of The Iron Age: The occlusion of hydrogen in iron may now be stated as a fact; and from recent investigations it has been determined that iron deposited galvanically contains very much hydrogen, with more or less carbonic acid, carbonic oxide, nitrogen and water, and that it may have occluded in it as much as 185 times its own bulk of these gases, principally hydrogen. These gases are evolved again on the application of heat.

This occlusion of hydrogen in iron is not an ordinary saturation; there appears to be no chemical action. It differs from the absorbtion of carbon, as the absorbtion of the latter does not in any case exceed 10 per cent. of the bulk of the iron, whilst the hydrogen is drawn with such force that 185 cubic inches of it may be packed and occluded in one cubic inch of the iron.

I conceive the cause of the absorbtion and occlusion of hydrogen in iron to be the molecular force of attraction, and that this force attracts the molecules of hydrogen, and compresses them within the physical pores of the iron.

The effect of the occlusion of hydrogen in iron is to make it hard and very brittle. The hardness is owing to the pores being filled with hydrogen of such extreme density, destroying the porosity of the iron. The brittleness is caused by the elastic force of the compressed hydrogen pushing against the sides of contiguous molecules of iron, thus reducing the resultant force of the physical structure, and causing the iron to be subject to a constant internal strain.

The occlusion of hydrogen in iron may seem to be of but little importance, but if the fact can be established that the occlusion is due to the force of attraction, will explain many phenomena exhibited in the manipulation of iron and steel, which have not been satisfactorily accounted for. ATOM.

August 3, 1874.

Progress of the Centennial Structure.

The Philadelphia *North American*, of the 6th, supplies the annexed details:

Whatever of doubt may have existed in regard to the ability of Mr. Dobbins to complete the Centennial buildings within the time required, it has been removed by the present progress of the work. Not only is the excavation for the Memorial Hall finished, and the grading and leveling for the Exhibition building nearly completed, but the foundations are going up with marvelous rapidity. That on the north front of the Memorial Hall has reached nearly the level for the first course of granite, while the interior piers and other walls are well under way. When it is understood that the foundation walls are almost as substantial as those of the new public buildings, the magnitude of the work and the rapidity of execution will be appreciated.

To assist the mechanics and laborers, both at the Memorial Hall and the Exhibition building, a railroad track runs directly through the center of the former, and another has been commenced that will encircle the latter. Two quarries at Conshohocken have agreed to supply all the foundation stone, and three immense derricks lift the ponderous masses direct from the trucks to their place in the wall. Not less than 10,000 perches will be required. For the Exhibition building piles will be driven for the foundations. Preparatory to this the ground has been leveled and the economy of time has been studied by removing the soil from the more elevated places to fill up all depressions on the surface, thus insuring but one handling of the earth. Quite an army of surveyors, with theodolite, rods and stakes, are daily engaged in marking the levels, and by the beginning of the coming week the ground will be ready for driving the piles.

The question of sewerage and drainage will be disposed of hereafter, and this branch of the work can be proceeded with independent of the erection of the buildings and without interference. In the meantime, however, a water main will be run through the center of the Pavilion grounds. Another feature connected with the leveling of the ground should be noticed as an evidence of foresight. All the top soil removed has been retained, and will be used to dress around the Memorial Hall, and insure a good sward by the time the celebration opens.

At the hall, too, several thousand bricks have already been received, and the first load of dressed granite is now on its way to this city from Maine, and the contractor for this portion will have all the stone on the ground as fast as Mr. Dobbins can place it in position.

Iron Sponge as a Purifier of Water.

In an article on the subject by Prof. Gustav Bischof, of Glasgow, we find the following:

I have experimentally investigated the following properties of spongy iron:

1. It decomposes water—even distilled water—which has been previously boiled. The decomposition of water is more energetic at the boiling point.

2. It reduces nitric acid to ammonia. This was proved in the following manner: One of Fresenius' tubulated cylinders for washing gases, was filled with spongy iron, and the latter washed with pure distilled water free from ammonia. No ammonia could be detected in the wash-water by the Nessler reagent. Then a solution of saltpeter, containing 5 m. gr. of nitrogen per litre, and free from ammonia, was slowly filtered through the spongy iron at the rate of one volume of the fluid, equal to the volume of spongy iron in the filters in three hours. The filtrate contained 1·4 m. gr. of nitrogen per litre in the state of ammonia, or twenty-eight per cent. of the equivalent quantity of nitric acid contained in the liquid.

3. From the fact that organic nitrogen and albuminoid ammonia are always much reduced after filtration through spongy iron, the conclusion must be drawn that spongy iron is capable of decomposing nitrogenous organic matter. Also the organic carbon, as will be shown presently, is very considerably reduced by filtration through spongy iron.

4. A minute, almost constant quantity of iron, about 10 m. gr. per litre, is dissolved by means of the carbonic acid contained in water, when filtering it through spongy iron, forming ferrous carbonate. The latter is very soon oxidized and precipitated, and it may then be so completely separated from water by mechanical filtration through paper or sand, or by allowing it to subside, that potassium ferri cyanide no longer indicates a trace of it.

If the water containing iron in solution be made to pass through a layer of finely divided marble, or ordinary limestone, the iron is retained at once as ferric-hydrate.

The Loch Katrine water exhibits a peculiar and quite exceptional behavior when filtered through spongy iron. If it be filtered very slowly, it comes out quite clear; but if filtered at the ordinaryrate of other water, it turns yellowish without depositing a precipitate of iron even after months. On adding nitric acid, the water becomes colorless; ammonia reproduces the yellowish color, and deposits, after some time, a small quantity of ferric hydrate. Sodium carbonate renders the liquid opalescent, bu' produces no precipitate, even after several days' standing, while the liquid becomes colorless by filtration through finely pulverized marble. One drop of a very weak solution of potassium permanganate produces a red coloration permanent for at least half an hour. Some carbonic acid, passed into the yellow liquid, produces in the course of a few hours, a precipitate of ferric hydrate, and it becomes perfectly colorless. The same effect is produced by passing a moderate quantity of carbonic acid into the Loch Katrine water before filtering it through spongy iron. Potassium sulphocyanide, as might be expected, does not produce a red coloration, and ammonium sulphide does not indicate the presence of iron, unless the solution be boiled with a few drops of nitric acid previous to the addition of ammonium sulphide. Pure distilled water, on being filtered through spongy iron, neither dissolves iron nor turns yellowish.

It is clear that this yellow coloration is due to some ferrous compound, formed if the quantity of carbonic acid in water be insufficient; but I am at a loss to name any known compound which would exhibit the above behavior, especially one from which the iron would be precipitated by carbonic acid, which is, as a rule, a solvent of iron. Under ordinary conditions, the water passes through the filter perfectly colorless, and only becomes opalescent when the iron begins to be precipitated; the precipitation of iron is retarded by passing an excess of carbonic acid into the water before filtration. The quantity of iron dissolved is of practical interest as regards the purification, inasmuch as the purification is more energetic, if by passing carbonic acid into a water the quantity of iron dissolved be increased. I have proved this by direct experiments.

5. The purification of water increases slightly for some five or six hours after the filtration through spongy iron has been completed.

6. If the iron be prevented from dissolving by adding to the water before filtration a minute quantity of sodium carbonate, the purifying power of spongy iron is considerably diminished.

7. The purifying action of spongy iron on organic matter is more energetic in hot weather than in winter, when the temperature of the water is frequently below the point (5° or 8°) at which fermentation ceases almost completely. These points appear to confirm my opinion, expressed on former occasions, that the action of spongy iron on impure water is two-fold—namely, chemical and mechanical. The chemical action must be found in its decomposition of water, to which is probably owing, in part at least, the decomposition of nitrites and nitrates, and the direct combination of nascent hydrogen with the nitrogen, to form ammonia. The readiest explanation for the decomposition of water is the intimate contact between electro-positive and electro-negative bodies, such as metallic iron and carbon, or even metallic iron and any ferric oxide which has escaped reduction; and it may be well supposed that, consequent to the galvanic current thus produced, the atmospheric oxygen dissolved in water is ozonized, and caused to act as a powerful oxidizing agent. I am driven to this conclusion from the results of a large number of analyses made before and after filtration through spongy iron, which, notwithstanding the fact of the reduction of the nitrates and nitrites, also clearly indicates an oxidizing action shown by the increase of nitrates after filtration. This increase is mostly considerable—up to twice the original quantity—whilst sometimes there is also a decrease. The quantity of albuminoid ammonia is, as already explained, considerably reduced through the filtration. There is no fixed rule for the increase or decrease of free ammonia before and after filtration, which appears to depend upon the predominance of certain agencies.

I have already alluded to the action of the iron which is dissolved in the purification of water. This action may either consist chemically in the iron being reduced by agency of organic impurities, whilst in some low state of oxidation, to a still lower state—the organic impurities thus becoming oxidized; the iron thus reduced may again be oxidized, either by means of the oxygen dissolved in water, or the oxygen resulting from the decomposition of water; or the action of the dissolved iron may be wholly or partly mechanical, consisting in a surface attraction of dissolved organic matter by the flocculent precipitate of ferric hydrate, similar to the action of the precipitated calcium in Clark's softening process, of alumina and other bodies. That the ferric hydrate has partly, at least, such a mechanical action, becomes probably from the fact that if its precipitation is hurried by the boiling, the purifying action is lessened.

I regret that I have to offer several hypothetical explanations regarding the theory of the action, but, although further researches may throw more light upon the question, it is intelligible that the action of such complicated bodies upon each other, some of which are present only in extremely minute quantities, should be enveloped in some mystery. There is, beside organic matter, another dangerous substance not unfrequently met with in water—namely, lead.

In 1851, Graham, Miller and Hofmann state in their report on the chemical quality of the supply of water to the metropolis, that they had arrived at the conclusion that softness of water alone is not itself to any great extent the cause of lead being dissolved from lead pipes. According to these gentlemen, supported also by researches made by Dr. Medlock at a later date, this is caused chiefly, if not wholly, by nitrates contained in water, which may either be lixiviated from rocks or be the product of decomposition of organic matter. The absence of calcium carbonate dissolved in free carbonic acid in water deprives the latter, in their opinion, of one of the readiest preventives of the solution of lead.

J. Smith found, in 1857, that so soon as the lead has begun to be corroded, or if it be exposed alternately to water and air, the corroding action of water is increased.

Pettenkofer experimented in 1864 on this question, and arrived at the conclusion that lead is oxidized exclusively by the action of atmospheric oxygen dissolved in water. Hence he shares Smith's views, that an alternate or simultaneous exposure to water and air is the most favorable condition for the corrosion of lead pipes. He is further of opinion that the frequently observed action of soft water on lead pipes is due to the absorption of oxygen by rain water. To the same cause may be due the action of soft river water, whilst hard water, which, when taking up mineral matter, loses more or less of its oxygen through the oxidation of organic and other matter, has a less corroding action.

Dr. Grace Calvert communicated to the meeting of the British Association, in 1861, the result of some 300 samples of Manchester water, which he tested during a period of more than twelve months. His conclusions are that the corroding action on lead pipes is strongest during the first four days, and that it then gradually decreases, unless the water be allowed to stand in pipes, or unless lead pipes be for a time in disuse, and then again employed. He found that soft water, which is almost free from organic matter, may also, under certain circumstances, corrode lead pipes to a great extent.

It is well known that in 1862 H. Schwartz proposed to put a stop to the corrosion of lead pipes by converting their interior superficially into lead sulphide, by means of a hot concentrated solution of sodium sulphide. He stated that not the least trace of lead is dissolved from pipes thus prepared, even when distilled water is allowed to stand in them for four weeks. I am not aware of any practical experiments with Schwartz's plan, and it would at any rate be a great difficulty to remedy the corrosion as the lead pipes already laid would have to be removed, which appears hardly practicable.

The performances of the locomotive whistle, we are told, have been systematized on a Western railway. Seven whistles are to indicate "down breaks;" 32 whistles, "up breaks;" 40 whistles and two snorts, a "back up." The instructions add: "In case of doubt, whistle like the d—l;" at street crossings whistle "considerably." Again: "Always whistle before dinner. Require the firemen to keep the whistle valve open during dinner. After dinner, whistle and squirt water; then back up. Then go ahead with a whistle, a squirt, and a ring." This sibillant method being achieved, may we not hope that the scream of the engine may in time be modified into something melodious? Then, indeed, we might have such instructions to the driver as these: "For 'down breaks,' play the chromatic scale; for 'up breaks,' the scale in C; for 'a back up,' the first six bars of the Overture to Zampa; in case of doubt, a double trill; and at street crossings, a series of significant runs." This, with some wild adagio to be performed after accidents, should the locomotive be well enough to appear, would render the signal system very complete.—*Tribune.*

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Surplus - $1,800,000, Gold.

The New York Agency, No. 50 Wall Street, buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER,
J. H. GOADBY, } **Agents.**

Katahdin Charcoal Pig Iron.
O. W. DAVIS, Jr., Manufacturer, **Portland, Me.**

Furnace in Piscataquis County, Me., for Car Wheels, Steam Cylinders, Boiler Plates, Hydraulic Presses, Plows, Chilled Rolls, and any purpose requiring great strength.

South Boston Tests, Katahdin Pig Iron.

No. 2,	density, 7·2002;	tensile strength	per square in.,	19,894
No. 3,	" 7·2432;	"	" "	26,928
No. 4,	" 7·2305;	"	" "	30,765

Shipped by rail or water from Bangor or Portland. Samples and analyses furnished on application.

THE
McHaffie Direct Steel Castings Co.
STEEL CASTINGS,

Solid and Homogeneous, guaranteed to stand a Tensible Strain of 25 tons per square inch. An invaluable substitute for expensive **WROUGHT IRON FORGINGS** or for Iron Castings, where great strength is required. Office, **cor. Evelina and Levant Sts., PHILADELPHIA.**

Send for Circular and Price List.

$30,000 to $50,000.

WANTED.—Additional capital in an Iron Furnace Company, now in operation and making Pig Metal at a profit of $8 to $10 per ton at present prices. A party who would take the active management of the business preferred; or the interest could be divided in $5000 to $10,000 shares. Present capacity of furnace, about 70 tons per week. With a small expense the production can be doubled. Address,

A. B., Furnace Company,
Office of The Iron Age, 10 Warren St., N. Y.

ASA SNYDER,
Scotch and Anthracite Pig Irons.

Also Furnace Agent and Dealer in the following brands of
Cold Blast Charcoal Pig Iron.
Stonewall, Rehoboth, Derr, Callie, Ravenscliff, Cedar Run, Wythe, Eagle, Greenville, Walton, &c.
Office and Yard,
1008, 1010, 1012 & 1014 Cary St., RICHMOND, VA.

TO INVENTORS.

Patents secured in the United States and Europe, on the lowest terms and very
PROMPTLY,
by **A. V. BRIESEN,** Solicitor of Patents and Attorney at Law in Patent Cases.
258 Broadway, N. Y., cor. Warren St.
Consultation gratis.

The Chilian Exposition.

Packages for this exposition can be shipped at the Pacific Mail Steamship Co.'s office, foot of Canal Street, New York, and from the Pacific ports touched at by the steamers of this company. One dollar, gold, for each package weighing not more than 2000 pounds or measuring not more than 20 cubic feet, is the only cost of ocean transportation to Chili. Heavier or larger packages may be shipped per same line at low rates under special contract. Applications for room at the Exposition must reach Chili by January 1st, 1875. Particulars may be obtained by addressing any one of the United States Commissioners for the Exposition, any Chilian Consul in the United States, or

A. VILLARROEL, Corresponding Agent,
No. 52 Pine Street, N. Y.

EUGENE BISSELL, Auctioneer.
By BISSELL & CO.,
Successors to R. T. Hazell & Co.,
Store No. 94 Reade Street.

Our REGULAR SALES of HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season.

CASH ADVANCES made on CONSIGNMENTS without additional charge.

To Quit Business.

Will sell the best appointed Hardware Store Building in the State of Ohio, with or without stock. Doing a very large and satisfactory trade. No bonus for the trade. Parties purchasingwill have a good and satisfactory business from the opening. Property rents at good prices.

For particulars inquire of

JOHN E. BYRNE,
99 Chambers St., N. Y.
JAMES C. JACOBS, Wooster, Ohio.

Special Notices.

MANUFACTURERS

desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at *99 Cannon Street, London, E. C.*

Scale: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

J. M. WHITE,
Architect and Constructor of Charcoal Blast Furnaces. Plans, Specifications and Estimates of construction furnished upon application.

Office address,
FON DU LAC, WIS.

For Sale, &c.

FOR SALE.—AN UNFINISHED IRON, TWIN SCREW STEAM VESSEL, having double bottom and water-tight compartments.

Length between Perpendiculars	390 feet.
Breadth of Beam	45 "
Depth to Main Deck	24½ "
Displacement at 22 feet draught	6,000 tons.
Area of Midship Section	893 sq. ft.
Number of Transverse Bulkheads	7
ENGINES.	
Two pairs, each driving one screw.	
Diameter of Steam Cylinder	72 inches.
Stroke of Piston	45 "
Surface Condensers, area	12,560 sq. ft.
SCREWS.	
Diameter	18 feet.
Pitch	27 "
Number of Blades	3
BOILERS.	
Ten in number; ordinary Horizontal Fire Tubular Type.	
Total Heating surface	28,000 sq. ft.
Grate Surface	875 "

This vessel was intended to be completed for the State of New Jersey as an Ironclad. The plans were prepared and the work was carried on under the direction of Gen. George B. McClellan, U. S. A. All materials and the workmanship are guaranteed to be of the best possible description.

The funds appropriated for the purpose of completing the vessel not proving sufficient, the Legislature of the State of New Jersey has directed that a sale be made to the highest bidder. A Commission, consisting of *His Excellency, Gov.* Joel Parker, of Trenton, *Vice-Chancellor* Amzi Dodd, of Newark, *Honorable Messrs.* W. W. Shippin and S. B. Dod, of Hoboken, has been appointed to effect such sale.

Bids endorsed "Proposals for the Purchase of Iron Steamer, or of Parts thereof," may be addressed to the Governor of the State of New Jersey, by whom they will be received at Trenton, N. J., until 12 o'clock, M., on the second day of November next, at which time they will be publicly opened.

Blanks for proposals, and a pamphlet containing a detailed description of the vessel, as nearly completed, except as to armor and armament, may be obtained by addressing either member of the Commission or the undersigned.

Permission to examine the vessel, and to inspect the premises, may be obtained (by intending purchasers) on application at the Dry Dock, where the ship now lies, or to the Consulting Engineer to the Commission, who will be prepared to exhibit drawings, to explain the structure of hull and machinery, and to give any other information respecting the vessel.

R. H. THURSTON,
Consulting Engineer to the Commission, Hoboken, New Jersey, United States of America

Charter For Sale.

A perpetual Charter, issued by the State of Pennsylvania, with privilege of mining and manufacturing in any State of the Union, or in any country, and with power to issue one million capital.

Apply to or address

WILLIAM E. S. BAKER,
132 Race St., Philadelphia.

FOR SALE.
At Lowest Manufacturers' Rates,
GUNS & SHEET ZINC,
Best German and Belgian Brands,
By *LOUIS WINDMULLER & ROELKER,*
90 Reade Street, N. Y.

FOR SALE,

£1. German consular instructions in English, published by subscriber, who *translates* from and into the English, Spanish, French and German. Latest *translations* made for the Spanish Government, Pacific Mail Steamship Co., Walter A. Wood, Morris, Wheeler & Co., Todd & Rafferty, and John T. Dunkin, N. Y.; Wilder & Co., Savannah; and the Tanite Co., Stroudsburg; by

C. KIRCHHOFF,
Commercial Editor "El Cronista,"
Box 2806, N. Y.

IRON FOR SALE.
Manufactured by the
ULSTER BLAST FURNACE,
NAPANOCH, N. Y.

Samples and prices with,
M. M. PILLSBURY, 85 John St., N. Y.

Valuable Iron Works For Sale.

The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,

Brick Pattern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flask and Heavy Core Spindles for making heavy Castin and Pipes of all sizes; Turning and Planing Too s

The Works can be put in immediate operation A favorable opportunity is here presented for enterprising men. The demand for Castings and Mach n ery is constantly increasing in this region. The prop perty will be sold on liberal terms. *If not sold in a reasonable time it will be for Rent.*

For particulars apply to

J. W. ROSEBERRY, Trustee,
Pottsville, Pa.

FOR SALE.

A well appointed **Hardware, Stove** and **Tin** establishment situated in a thriving village of Western New York. Satisfactory reasons given for wishing to sell. I will make it an object for a young man with a small capital to purchase.

Address, *HARDWARE,*
Office of The Iron Age, 10 Warren St., N. Y.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Aug. 12, 1874.

What little interest has existed in Wall street during the past week has mainly grown out of the advance of 1 per cent. in the Bank of England discount rate. This caused considerable excitement among those owing debts in London, and led to an advance of bankers' demand bills to 4·91. The only event of local importance was the suspension of the large house of Paten & Co., who gave notice on Saturday that they were unable to meet the seventh instalment of their paper, due Monday, and given in settlement at the time of their suspension in the panic last autumn, by reason of heavy committals to a Western railroad —the Des Moines Valley Railroad. This had little effect on the dry goods market, and scarcely any in Wall street, where only about $70,000 of their suspension paper was held. It is proper to say that they had promptly paid the six preceding instalments, amounting to fifty-five cents on the dollar, and that they claim to have assets which fully cover all liabilities, but which at present are not negotiable.

The money market has been extremely easy during the week. Call loans have been freely offered at 2@3 per cent., and prime commercial paper has been discounted readily at 5@7 per cent. The bank statement shows a decrease in loans of $1,478,300. The next largest change was in legal tenders, the average amount held during the week having been $730,600 more than the preceding week. The specie average rose $446,300, notwithstanding the heavy shipments, the loss of which, it is proper to say, does not count more than one day in the averages. Early in the week the coin disbursements by the Treasury were large. Next week's statement will show to-day's shipments. The total reserve has been augmented by the sum of $1,176,900. Under the present law the banks are required to hold $60,565,400 lawful money; they actually hold $92,289,500, so that the banks have $31,724,100 above the legal requirement, which is $1,296,825 more than last week. The following is a comparison of the averages for the past two weeks:

	Aug. 1.	Aug. 8.	Differences.
Loans	$282,012,600	$280,534,300	Dec. $1,478,300
Specie	25,293,700	27,740,000	Inc. 446,300
Leg. Tens	65,81 ,900	66,549,500	Inc. 730,600
Deposits	242,741,300	242,261,600	Dec. 479,700
Circulation	25,762,200	25,805,760	Inc. 43,500

The gold market has been unsettled during the week, but became steady toward the close. The following shows the daily fluctuations of the premium:

	Highest.	Lowest.
Thursday	110	109⅝
Friday	110⅛	109⅞
Saturday	110⅛	110
Monday	110	109⅞
Tuesday	109⅞	109⅝
Wednesday	109⅞	109⅝

Government bonds have moved in close sympathy with gold. There has been a large movement in new fives, which have been sold to reinvest in registered 10-40s. State bonds are strong and railway mortgages steady.

The stock market has declined from speculative causes. The principal dealings have been in Lake Shore, Pacific Mail, Western Union, Union Pacific, C., C. & I. C., St. Paul, Northwestern and O. M.

The following tables show the movements in foreign trade for the week:

IMPORTS.

	1872.	1873.	1874.
Total for week	$9,254,668	$6,985,841	$7,091,676
Prev. reported	260,416,069	245,558,060	246,383,750
Since Jan. 1	$269,670,737	$252,543,901	$253,393,426

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Brass goods	6	1,114
Bronzes	64	9,155
Chains and anchors	199	8,984
Copper		10,403
Cutlery	108	41,064
Guns	41	6,374
Hardware	49	6,840
Iron, pig, tons	1,100	28,302
Iron, sheet, tons	33	2,103
R. R. bars	4,337	99,707
Iron, cotton ties	400	1,204
Iron, other tons	504	11,341
Lead pigs	4,632	28,084
Metal goods	186	23,794
Nails	4	729
Needles	30	9,408
Old metal		3,434
Per. caps	13	2,181
Saddlery	6	1,191
Steel	2,970	16,672
Spelter	55,125	2,593
Tin, boxes	11,385	100,869
Tin, 1386 slabs	66,289	14,249
Wire	78	1,654
Zinc	228,185	12,693

EXPORTS EXCLUSIVE OF SPECIE.

	1872.	1873.	1874.
For the week	$5,278,242	$5,276,814	$5,351,353
Prev. reported	128,330,129	168,992,120	175,763,020
Since Jan 1	$133,608,371	$174,268,934	$181,114,373

EXPORTS OF SPECIE.

Total for the week	$3,521,442
Previously reported	33,355,067
Total since January 1, 1874	$36,876,509
Same time in 1873	38,016,788
Same time in 1872	54,861,089

Government bonds closed as follows:

	Bid.	Asked.
U. S. Currency 6's	117⅜	117⅝
U. S. 6s 1881, reg	117⅛	117⅜
U. S. 6s. 1881, coup	118⅛	118⅜
U. S. 1862, 5-20 reg	111⅛	112⅛
U. S. 5-20 1863, coup	111⅜	112⅜
U. S. 5-20 1864, reg	114⅛	114⅜
U. S. 5-20 1864, coup	115⅛	116
U. S. 5-20 1865, reg	114⅛	115
U. S. 5-20 1865, coup	116⅛	117⅛
U. S. 5-20 1865, reg. new	115⅛	115⅝
U. S. 5-20 1865, coup	116	116⅛
U. S. 5-20 1867, reg	116	119⅛
U. S. 5-20 1867, coup	117⅜	117⅝
U. S. 5-20 1868, reg	116	116⅛
U. S. 5-20 1868, coup	117⅜	117⅝
U. S. 10-40 reg	110⅛	110⅝
U. S. 10-40 coup	113⅜	113⅞
U. S. 5s of 1881, reg	111⅜	112
U. S. 5s of 1881, coup	111⅞	112

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	100¾	100⅝
Lake Shore	72⅝	72⅜
Rock Island	99	98⅞
New Jersey Central	106	106
Del. Lack. and Western	107¾	107⅝
Wabash	34¾	35⅜
Western Union Telegraph	75¾	75
Northwestern	38¼	37⅝
Milwaukee & St. Paul	34⅜	34⅛
Milwaukee & St. Paul Preferred	53	53
Panama	111	111
Pacific Mail	46¾	46⅛
Erie	32⅝	32¼
Ohio & Mississippi	23	22¾
Union Pacific	29¼	28⅞
C. C. & Ind. Central	12¾	12¼
Quicksilver	27⅛	27⅛
United States Express	67½	67⅛

GENERAL HARDWARE.

There are a large number of buyers in town, but they are buying rather sparingly, especially in those lines of goods of which the prices have not been sustained since the panic. We know of several articles the prices of which have been steadily maintained for a long time, for which the orders have been quite up to the average for this season, while the trade do not seem to have the same confidence in the prices of articles which have fluctuated during the same time, although they may be relatively much cheaper.

The works of the Enterprise Mfg. Company of Pennsylvania were partially destroyed by fire early on Tuesday morning. The loss was about $25,000, covered by insurance. The company will take energetic measures to enable them to resume operations as early as possible, and they hope to be able to fill orders soon.

Hogan, Clarke & Sleeper have issued a circular to their creditors announcing their inability to meet their liabilities and appointing a meeting at their store in Boston, on Friday of this week.

Rowland's Shovels and Spades have been selling at irregular prices, down to discount 30 and 10 per cent. It is reported that there has been a recovery to some extent, but we could neither substantiate the statement nor get definite quotations.

There has been a meeting of Auger manufacturers, and it is understood that a minimum price was agreed upon, which amounts to a little stiffening without any advance in quotations.

The Plated Ware manufacturers held a meeting on Saturday last, but as a quorum was not present, no business was done.

Hayden, Gere & Co. are rebuilding their works at Haydenville on the old site, and expect to have them completed by Nov. 1st. They have now a large stock of goods on hand, and are ready to fill all orders. Their Iron foundry was in operation a week after the flood, and in their temporary works they are now running sixty lathes.

Abraham Bussing, Secretary of the Ausable Horse Nail Company, has shown us samples of their new Hammer Pointed and Blued Nail, which are certainly very handsome, and will, we should judge, have a large sale. Mr. Bussing expects to have a stock of them next week. The price is 2 cts. per pound higher than their common Nail, which makes No. 8 26 cts. per pound. All the various Nails made by this Company may be joined to make up quantities for extra discounts.

We have received the following letter:

NEW YORK, August 12th., 1874.

To the Editor of The Iron Age: In reply to numerous inquiries, elicited by your last edition, we would say that there has been no break in our prices for Sand Paper, which are the same as they have been for a year past.

Yours, &c.
BAEDER, ADAMSON & Co.

While the above letter fairly states the position of the manufacturers, it is only proper to add that the price from second hands in this market is still irregular, one large house continuing to quote discount 15 and 5 per cent., and others discount 15 per cent.

The demand for Foreign Hardware, although considerably stimulated by the presence of numerous buyers, fails to meet the general anticipations of the trade; the feeling is, however, general, that the wants of the country are, if anything, larger than usual at this season, and the extreme caution which characterizes buyers is attributed more to an uncertainty regarding the future of prices than to any fear of overstock. In this state of affairs it is encouraging to note the general firmness of the market. We have no changes in quotations to notice.

A meeting of the Nail Manufacturers' Association was held at Long Branch on the 6th instant. It was unanimously resolved to amend the present schedule of extras, by making Flooring, Casing and Box Nails 75 cents per keg extra; Finishing, $1 per keg extra, and Fine Finishing Nails, $1·25 per keg extra. The following establishments were represented at the meeting:

Fall River Iron Works.
Tremont Iron Company.
East Bridgewater Iron Company.
Old Colony Iron Company.
Wareham Nail Company.
Robinson Iron Company.
Weymouth Iron Company.
Somerset Iron Company.
Parker Mills.
Providence Iron Company.
Boonton Iron Works.
Oxford Iron Company.
Cumberland Nail and Iron Company.
Duncannon Iron Company.
Pottstown Iron Company.
Chesapeake Nail Works.
Harrisburg Nail Works.
Birdsboro' Nail Works.

No further change in the card was adopted, which continues as before at $4 for 10d. to 60d. Common, Fence and Sheathing Nails. We publish below the revised card:

COMMON, FENCE AND SHEATHING.

	Per keg.
10d. to 60d	$4·00
8d. and 9d	4·25
6d. and 7d	4·50
4d. and 5d	4·75
3d.	5·50
3d. fine	6·25

COOPERS', SLATING AND TOBACCO.

10d. and larger	$4·50
8d	4·75
6d. and 7d	5·00
4d. and 5d	5·25
3d. Slating	6·00
Spikes, of all sizes	4·25

BOX AND FLOORING.

10d. and larger	$4·75
8d	5·00
6d. and 7d	5·25
4d. and 5d	5·50

BRADHEAD OR FINISHING.

10d. and larger	$5·00
8d	5·25
6d. and 7d	5·50
4d. and 5d	5·75

Fine Finishing, $1·25 a keg above same size Common.

CLINCH NAILS.

		½ kegs.
3 in. and larger	$5·50	$3·00
2½ and 2¾ in	5·75	3·13
2 in. and 2⅜ in	6·00	3·25
1¾ in	6·25	3·38
1½ in	6·50	3·50

The market for Nails continues in the weak and unsatisfactory condition noticed for some time past. We quote 10d at $3·75@$3·85, in small lots. Large orders are easily placed at $3·70, net, with a few exceptions of special brands, which are held firmly for $3·85 in large or small lots. The demand is fair.

The following letter explains itself:

Office of the NORWICH LOCK MFG. CO.,
NORWICH, CONN., August 8, 1874.

Editor of The Iron Age: We desire to give notice through your columns that we have withdrawn our agency from Messrs. Hogan, Clark & Sleeper, 82 Chambers street.

Due notice of its re-establishment and location will be given.

NORWICH LOCK MFG. CO.

We have received from the Norwich Lock Mfg. Co. a copy of their new illustrated Catalogue; also their revised price list, containing all the changes made since their list of January 1st was published. The new Catalogue covers 164 pages, showing an addition of 20 pages to their Catalogue of 1872. It is printed on heavy tinted paper, and bears evidence of care and judgment in the clear and systematic arrangement and concise descriptions of its contents. They inform us that they are constantly adopting such additions and improvements to their line of goods as will be of essential value, and it is their intention to keep before the trade a line of goods second to none in quality, style and finish. This catalogue, which is comprehensively illustrated, will be furnished to the trade on application. Their terms and discounts are unchanged.

J. Clark, Wilson & Co., agents for the Taylor Mfg. Co, quote Gong Bells at discount 25 per cent., instead of list to discount 10 per cent. as formerly. They have added to their line of Lanterns a new pattern, which they style the "Star Tumbler" Lantern. The globe of this Lantern is an ordinary Glass Tumbler, and it is claimed for the Lantern, which will burn Kerosene or other oils, that it will not blow out when subjected to the wind. It is placed on the market at $4, net, per dozen; for orders of 50 dozen and upward a concession from this figure would be made. We are informed that this article is meeting with a large sale.

We invite attention to the advertisement on page 27 of H. Carter, No. 290 Pearl street, manufacturer of Molders' and Plasterers' Tools, Mitering Rods, Screw Drivers, &c. This house, in addition to dealing in General Hardware, has for many years made the manufacture of Molders' Tools a specialty, and claims to keep in stock the largest and most complete assortment of these goods to be found on this continent.

On the 16th page we print a notice of an important auction sale of Hardware, Cutlery, Guns, &c., to take place on the 25th and 26th instants, at the sale rooms of Bissell & Co., No. 94 Reade street.

Sargent & Co. issue the following circular under date of the 1st instant:

We have been appointed agents for the sale of the goods manufactured by F. H. Aiken, of Franklin, N. H., as per notice below, and are prepared to fill orders, at bottom prices, as follows:

	Per doz.
Pocket Wrenches	$10·00
	33⅓ per cent. discount.
Hammer Saw Sets	$15·00
Awls and Tools, 10 Brad Awls and 10 Tools	15·00
" " 10 Brad Awls	11·25
	Per gross.
Extra Brad Awls, Assorted	$4·50
Extra Tools, Assorted	5·00
	All the above 16⅔ per cent. discount.

10 per cent. extra discount for prompt cash.

When the above goods are ordered in original packages, viz., Saw Sets and Awls and Tools in cases of six dozen each, and extra Brad Awls and extra Tools, one gross each, a further discount of 10 per cent. will be allowed.

Yours, respectfully,
SARGENT & Co.,
New York and New Haven.

NOTICE.

FRANKLIN, N. H., Aug. 1, 1874.

I have this day removed the agency for the sale of my goods to Sargent & Co., of New York, where I shall keep a full stock of my manufactures, to be sold at factory prices.

F. H. AIKEN.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, Aug. 12, 1874.

Scotch Pig.—The market is now active, with a large demand and prices firm. The amount of business is considerable. Makers' price for No. 1 Gartsherrie is 115/.

Manufactured Iron.—The demand is improving, with a fair amount of business doing. We still quote Best Staffordshire Bars £10. 10/@£12, but prices are weak.

Rails.—We note no change in the market, and continue to quote £7. 10/@£8. 5/.

IRON.

American Pig.—Although reports of improvement in the Iron market come from other important points, there is no change for the better to be noted here, and much disappointment is expressed at the restricted demand for Pig Iron. It was expected that by this time some activity would have been displayed, but these hopes have not been realized, and there seems no disposition to buy beyond immediate requirements. There is a noticeable absence of any speculative feeling, and lots which have been pressed for sale have not called out any but very low offers. We note the sale of 1000 tons, part Gray Forge and part Mottled, at $24, at works; 500 tons No. 2 Foundry, at $27; 2000 tons Gray Forge, $25, six months, without interest; and 1000 tons Gray Forge on private terms. We quote: No. 1 Foundry, $30@$32; No. 2 Foundry, $28@$30; Gray Forge, $25@$28. It will interest the trade to know that on the 4th inst. the style of the well known firm of Lazell, Perkins & Co., of Bridgewater, Mass., which has been in existence since 1816, was changed to The Bridgewater Iron Co. The capital stock was increased. The manager of this company, Mr. Nahum Stetson, has been connected with the concern over forty years.

Scotch Pig.—There is no change since last week. Transactions have been small, and prices have not fluctuated. 100 tons Glengarnock was sold from ship at $33, prompt cash. We quote Coltness, $40; Glengarnock, $35; Eglinton, $33@$33·50.

Bar.—While there has been no marked improvement in the demand for Manufactured Iron during the past week, there has been no weakening on the part of the producers; on the contrary, they seem more than ever confident that not only will the late advance be sustained, but that still better prices will rule before many days. The prompt action of the Pittsburg mills in following the advance made by the Eastern mills, has strengthened the movement greatly, while the absence of all pressure to sell gives the market a more healthy tone than it has had for months. We continue to quote Refined Bar at 3c. per pound.

Rails.—We note the sale of 1600 tons Welsh on private terms, and 1000 tons, 50 lb., at $50, gold. We hear of nothing in American, which we quote as last week, for heavy sections at works, $56, cash, and $58, time, and we hear of Rails offered below these figures. We quote Welsh, $48@$50, gold.

Old Rails.—We hear of no new transactions, and quote as last week, $34@$35. In the West they are offered at much lower figures.

Scrap.—We note the sale of 1000 tons to arrive, on private terms. From yard we quote $35@$37, without important sales.

METALS.

Copper.—Lake, since our last issue, has been active at from 20c. down to 19c., sales aggregating about 3,000,000 pounds, mostly at the latter price. One-third of this quantity has been taken for export at 19c. from the hands of bankers that held it for account of the late heavy operators, and of it 800,000 pounds are understood to go to Hamburg. The remaining two-thirds were taken by both speculators and manufacturers, principally the latter. At the close there is more tone to the market, the asking price ranging between 19½c. and 20c. At 19c. manufacturers have been willing buyers, and would probably continue to be so; beyond this figure they are, from all appearances, not eager to go at present, at least not till they can form a more correct judgment of the general position here. The sellers of the above 3,000,000 pounds were, on the one hand, the larger Lake companies, and on the other, the bankers, about equally divided between the two. The bankers have, of course, no settled policy in handling their Copper; they may assure us that they will hold the balance for a long time, and yet may turn round and sell the next day, as their necessities or caprices may dictate. On the other hand, they may ship to Europe, or others may buy of them and ship, and in a month's time the identical Copper may be coming back, per steamer, or offered by cable. From the moment that this outside element is introduced into our Copper market, there is no saying what may happen in the way of fluctuations. A new ring between a few of them and some dealers and companies may be patched up at any given time; hence the best course for the consumer to follow will be to buy at about the current figure, say between 19c. and 20c., and be content with securing a supply at a reasonable price, as near the intrinsic value of the staple as he can expect to purchase under the circumstances. The firmer feeling is the natural rebound from a sudden and severe decline, and does not indicate in the least that we shall straight away return to 22c., unless, as we have hinted, another pool be made up, this time between holders that would not be found acting together under ordinary circumstances. We are in receipt of our Valparaiso mail, dated 14th and 30th June: "*Copper in Bars.*—At the time of last steamer's departure, May 31st, the higher quotation of £79. 10/ was received from London, causing our market to rise to $16·25, on shore here, at which figure everything offering since has been taken, while of coast brands 140 tons Ossa and 110 Urmeneta sold at $16·75, on board, and 200 Lota and 110 Lambert brought $17, on board, since; but buyers now decline to go on at the same rate. Regulus first sold at $7·10, and since then at $6·95, on board, and 3000 quintals ore at $2·93¾. Total sales 19,617 quintals Copper, 28,000 do. Regulus, and 3000 Ore. On the 15th instant duller accounts came dropping in from Europe, causing the market to recede to $15·75, on shore here, at which 1108 quintals Copper in bars were sold, and 300 tons Lota at $16, on board, the latter price also offering for Urmeneta, but holders do not wish to sell, advices being again more favorable. Total sales 7952 quintals for the latter half of June. No more sales of either Regulus or Ore. I quote Bars, on shore here, $15·75; Urmeneta, with a 60/ steam freight, $16@$16·25, on board; Lota, $16; Regulus, 50 per cent., $6·30@$6·35, and Ore, 25 per cent., $2·75. Exchange, 60 to 90 days, 44½d. @ 45d. per dollar." LONDON, Aug. 12, per cable: "Chili Bars, £76. 10/." The manufactures of Copper remain nominally unchanged, with a light business, as follows: New Sheathing, 33c.; Bolts and Braziers, 35c.; Bronze and Yellow Metal Sheathing, 24c., and Yellow Metal Bolts, 30c., net cash.

Tin.—Presents no features of interest; the future is as uncertain as can be, and greatly depends upon the fulfillment of our hopes of a good fall business after it has declined to a range, which cannot certainly be called a high one, although some people are not sanguine, and expect even lower prices in the immediate future. The business done has been a small, jobbing trade, and the market is, on the whole, quiet. We quote as follows: Straits, 22½c., gold; L. and F., 21c.; English Refined, 21⅝c.; and Banca, 25½c., all gold. SINGAPORE, Aug. 10th.—"Malacca Tin, $25 per picul." BATAVIA, Java, same date.—"Tin sale of Billiton came off at 60·34 guilders per picul average." *Tin Plates.*—The marked is steady, with sales of 1000 boxes assorted I. C. Charcoal at $10@$10·25, gold; and 500 Charcoal Terne at $8·75@$9, ditto. We quote as follows: I. C. Charcoal, $10@$10·25, gold, per box; I. C. Coke, $7·75, at which it is dull; Coke Terne, $7@$7·50; and Charcoal Terne, $8·75@$9, all gold.

Lead.—Bids have been made on government Lead, and the decision, or awards, will probably be known either late to-night or to-morrow morning; meanwhile, all purchasers temporize. American has been moving off in moderate quantities at 5¾c., gold, and Foreign, without anything transpiring, is held at 6¾c., ditto. The markets in Europe are firm, but there is little doing on the other side. Stocks here and in our immediate vicinity are understood to be but light, yet it is extremely difficult to get at the precise truth on this subject. Now that our domestic product gets to be so very important, Lead accumulates at the various smelting works, and is there held subject to requirements. While we were importing the bulk of what we consumed, the import lists enabled us to trace the statistical position with a certain degree of accuracy which now escapes us. The manufactures of Lead are steady, as follows: Bar, 8¼c. per pound; Pipe, 9c.; Sheet, 9c., all with 22 per cent. discount; Tin Lined Lead Pipe, 16½c., less 10 per cent.

Spelter and Zinc.—Of Spelter special foreign brands have been sold at 6¾c., gold; while foreign of inferior quality can be had at 6½c. to 6⅝c., gold. The markets in Europe are unchanged. Domestic sells freely at 6¾c., currency. There being a better demand for Copper from manufacturers since the failure of the corner in that metal, there is likely to be a briskening up in Spelter likewise. Stocks of Foreign are quite moderate, say 200 tons. Domestic being generally sent direct from the works as wanted, little is kept thereof in the hands of dealers. Sheet Zinc is inactive at 8c. @ 8¼c., gold.

Antimony is quiet at 11½c. @ 11¾c., gold.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending August 11, 1874:

Hardware.

Beam & Murray, Casks, 19
Boker Hermann & Co. Mdse. pkgs., 2
Carr & Rockafellar, Packages, 7
Dickinson Henry, Packages, 5
Fuller Bros. Cutlery, cs., 1 Cases, 1
Friedmann & Lauterjung Cutlery, cs., 5
Max, Jacoby & Zeller, Cases, 1
Manheim Wm. Cases, 1
North Atlantic Ex. Co. Cases, 1
Struller Louis, Arms, cs., 29
Spies, Kiesam & Co. Guns, cs., 7 Casks, 2
Wiebusch F. Mdse. pkgs., 14

Iron.

Drexel, Morgan & Co. Bundles, 7
Hernandez & Tracy, Cases, 2
Henderson Bros. Pig, tons, 300
Johnston, J. Boorman & Co. Pig, tons, 100
Naylor & Co. Bars, 1315
Pierson & Co. Rods, bdls., 183
Reynal & Co. Scrap, tons, 8
Seligman J. & W. Casks, 500
Order. Scrap, bxs., 67 Sheet, bdls., 255

Steel.

Drexel, Morgan & Co. Cases, 12 Bessemer bars, 180 Bars, 836
Naylor & Co. Rails, 2438
Prosser Thos. & Son, Axle forgings, 66
Sanderson Geo. & Co. Casks, 5 Cases, 3
Woodford W. C. Cases, 115
Order. Wire, bdls., 95 Bundles, 80 Scrap, tons, 4

Metals.

Bruce & Cook, Tin, slabs, 180
Grund F. & Cerero, Lead, pigs, 1200
Naylor & Co. Terne plates, bxs., 1794
Phelps, Dodge & Co. Tin plates, bxs., 6250 Zinc, sheets, cks, 282 Tin, ingots, 600
Order. Tin and terne plates, bxs., 5994 Spelter, plates, 2468 Lead, pigs, 2928

OLD METALS, PAPER STOCK, &c.

The market for Old Metals, Rags and Paper Stock still continues very dull, but it is expected that there will be some revival of trade next month. Quotations, with very few exceptions, are marked down. We quote the following as the purchasing rates:

Old Metals.—Copper, 15c. @ 16c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 14c. @ 15c.; Lead, solid, 5½c.; Tea Lead, 4c.; Zinc, 4½c. @ 5c.; Pewter, No. 1, 19c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5¼c., Wrought Iron, 1¼c.; Sheet do., ½c.; Cast, do., ¾c. @ 1c.; Machinery, do., 1c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No. 1, 6c. @ 6¼c.; No. 2, 2½c.; White, No. 1, 6½c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 4½c. @ 5c.; Gunny Bagging, 1¾c. @ 1½c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1¼c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2¾c. @ 3c.

COAL.

The Coal market is without any change since our last report. Trade is very quiet, and is expected to continue so until the first of next month.

The quantity of Coal sent from the Schuylkill region for the past week was 105,943 tons by rail; by canal, 23,070. Total, 129,013 tons, against 123,946 for the corresponding week last year. Decrease, 5067 tons.

The quantity sent from all the regions was 407,165 tons Anthracite, and 72,198 Bituminous. Total for the week 479,363 tons, against 530,648 tons for the corresponding week last year. Decrease, 51,375 tons.

The market for Bituminous Coal is quiet, with no great quantity of Coal moving. Prices are about the same as last quoted, and no

change is expected in them for at least another week. The market for Anthracite is also dull.

The quotations for Anthracite are $5·25 @ $6·10, by the cargo. For Gas Coals the prices are: Pennsylvania and Westmore'and Gas, $7·50 @ $8; West Virginia, $7·25 @ $7·50; Cumberland, soft, $6·75 @ $7; American Cannel, $12 @ $14.

During the week ended August 8th the amount of Coal shipped over the Cumberland & Pennsylvania Railroad was 50,914 tons, an increase of 1749 on the shipments of the same week last year. The total shipments for the year are 1,194,038 tons, a decrease, as compared with last year, of 86,849 tons. The shipments by the Cumberland Branch Railroad for the week are 141,811 tons, an increase of 11,545 tons over last year.

PHILADELPHIA.

PHILADELPHIA, Aug. 12th, 1874.

The market for Iron in this city is scarcely as active as last week, when prices were stiffer, and a much better feeling prevailed than at any time since the panic. The present lull is generally considered to be only temporary, and it is conceded on all sides that the turn in the market has really taken place. From present appearances there will be no speculation in Pig Metal this fall, just why, does not appear, since present prices and the condition of the trade both invite a speculative movement, and promise higher prices. While there is not so much doing in Foundry Irons, Forge Pig is in active demand, and scarce; and while sales covering the next five months deliveries have been made by many of the furnaces, as a general rule they refuse to contract over 60 to 90 days ahead. Notwithstanding the principal demand is for Forge Pig, very considerable lots of Nos. 1 and 2 Foundry have changed hands.

In Manufactured Iron there is a decidedly better feeling since the advance in Bars to 3c. per lb., at which there have been some large sales, and now are some considerable specifications offering which it is not likely will be booked under a further advance. In Rails there is much more activity, with a strong inquiry at better terms of payment, and generally for new roads; the sales carrying with them a considerable trade in Fish Bars and Spikes. Old Rails are more in demand, and quotably $1 higher than last week for spot deliveries, as is natural in the scarcity of Forge Pig, and under the same influence Scrap grows scarcer and is more sought.

There is no material change to note in prices, unless it be that quotations mean selling figures, and are not shaded $1 to $2 per ton to effect transactions. Practically, the producers are now masters of the situation, with, however, sufficient diplomacy not to jeopardize the growing trade by any sharp advance in prices. The market closes fairly active, with a general expectation of more doing in the coming week. We quote:

PIG IRON.—No. 1 Foundry, $31 to $32; No. 2, $28 to $30; Gray Forge, $26 to $28; White and Mottled, $24 to $25.

BARS.—3c. per lb,

RAILS.—$58 to $64, as to make and section at mill.

OLD RAILS.—$37 to $38, and firmer.

SCRAP.—$35 to $36, for choice selections.

The sales of last week having been omitted by accident are here included, much reticence being exhibited in quoting transactions, as is generally the case in an improving market.

SALES—PIG IRON.

2,500 tons	No. 1 Lehigh	Foundry...Furnace,	$30·00
1,000 tons	No. 2 "	" ..... "	27·50
1,000 tons	No. 2 "	" ..... "	28·00
2,700 tons	Gray Forge Lehigh	Foundry. "	26·00
3,000 tons	"	"	private terms.

RAILS.

5,000 tons	Western Mill	...private terms.
3,500 tons	Penna. "	.....$61·00
1,700 tons	" "	for W'n del'y, private terms.
1,500 tons	" "	" " "

With Fish Bars and Spikes for above lots.

OLD RAILS.

2,500 tons equal to	$36 00 here
1,600 tons Philadelphia delivery	37·00 "

SCRAP.

500 tons	$35·00, spot.
300 tons	36·00, "

PITTSBURGH.

PITTSBURGH, August 10, 1874.

PIG IRON.—Business in Pig Iron circles continues very quiet, as far as our market is concerned, but an early improvement in the demand is confidently expected, and holders generally expect to be able to realize better rates within the next few weeks. During the past week, however, trade has been very dull, as compared with what it was in June and the early part of July. The general situation does not differ much from what it has been for some time past; the demand is confined almost entirely to supplying immediate wants, while prices have undergone no quotable change. Some of the mills are pretty well stocked, as they have been buying more or less during the past sixty days. They were and are still ready to negotiate with those who were in need of funds, and who, in consequence, were ready to concede as regards price, although there are but very few producers in this situation now as compared with the early part of the year. There are other mills, however—perhaps they are in the majority—that have little or no stock; they have been holding off—refusing to buy—being impressed, apparently, with the belief that they would be able to do as well, if not better, when they needed it, consequently there is not much doubt but what there will be considerable activity in pig as soon as the fall trade fairly opens up, and I should not be surprised if an advance, say of one or two dollars per ton, was established, although this, as already intimated, is a disputed point.

QUOTATIONS.

No. 1 Foundry	$29·00 @ 30·00—4 mos.
No. 2 Foundry	27·00 @ 28·00—4 mos.
Gray Forge	26·00 @ 27·00—4 mos
White and Mottled	24·00 @ 25·00—4 mos
Hot Blast Charcoal	30·00 @ 35·00—4 mos.
Cold Blast Charcoal	45·00 @ 50·00—4 mos.
Blooms, as per quality	80·00 @ 90·00—4 mos.

MANUFACTURED IRON.—The general position of the market for finished Irons remains substantially as noted in my last review. As I then stated, a firmer feeling prevails, and while there has been no change made in the card, an advance has, in reality, been established. Until quite recently, orders were accepted on a basis of 2½ cents for Bars, and some sales, it is said, were made as low as two and four-tenths, whereas, at the present writing, it would be difficult to place an order in this market under 2·69 to 2·70. It is understood that some of the balance sheets do not make as favorable a showing as was expected, and manufacturers very generally are determined to have better rates during the last half, than prevailed in the first half, of the year. The general outlook is regarded as being favorable for a good healthy fall trade, and I feel satisfied that manufacturers, while they may not do as much business, will make more money from now until January, than they did from January to July.

STEEL.—There is a continued good demand, especially for Plow and Tool Steel, and the mills, so far as I can learn, have all they can do, and, furthermore, there is not much doubt but what this will continue during the balance of the year. As in the case of Iron, it is claimed that prices are too low, lower than there is any necessity for, hence an early advance is not improbable. There is not much doubt but what the consumption of Steel of all kinds will be considerably larger from now until the close of the year than it was from January until now, hence an increased trade as well as better rates are expected.

NAILS.—The Nail trade continues quiet, and the market, in a general way, presents but little that is really new; however, it is nearly always quiet at this particular time, while, as regards prices, there has been no quotable change during the past week—$3·40 to $3·50. As stocks are known to be light, both in first and second hands, a good fall trade is expected, and an early advance in price, in sympathy with Iron, is not improbable.

SCRAP IRON.—Trade in Scrap Iron continues quiet, although the market is firmer than it was, and improved demand and better prices within the month or two are expected. There is still some activity in Scrap Steel, with occasional sales, but business generally is quiet, as it usually is at this season of the year. Prices, as compared with last week, have undergone no change.

GLASS.—The Window Glass trade, while it cannot by any means be termed active, is holding pretty well, it is even better than ordinarily at this season of the year, and with very limited stocks and a moderate demand, prices, which are slightly better than at this time last year, are fully sustained. Discounts unchanged at 60 to 65 per cent. off Pittsburgh list. The Bottle trade is still reported dull. There is no abatement in the demand for Fruit Jars, and, notwithstanding manufacturers have been working up to their full capacity all the season, some of them are still unable to catch up with their orders.

UNFOUNDED RUMORS.—Rumors have been in circulation during the past week that some additional Iron firms were in trouble, and that more failures and suspensions were near at hand. Your correspondent took occasion to inquire into the matter, and is gratified to report that these rumors have no foundation in fact. It is probable they originated in the complications of Lyon, Shorb & Co., with the A. V. R. R., through the late Col. Wm. Phillips, for whom they indorsed largely, and the suspension of Harbaugh, Matthias & Owens, of the Superior Rail Mills, to which reference was made in my last. If there are any other Iron firms here in trouble your correspondent is ignorant as to who they are; notwithstanding, as already stated, he made inquiry of parties who, from their position, would be likely to know. Our Iron men, and, indeed, Pittsburgh manufacturers generally, are in good condition financially, and it is not likely that there will be any additional failures or suspensions to record soon, at least it is hoped not.

The Pittsburgh *Commercial*, of August 8, says: There has been no material change in the Pig Iron market since our last report. The sales reported amount to about the same as last week, and prices are unchanged, and may still be fairly quoted at $27, 4 months, for Gray Forge, and $28 to $30 for foundry. We have heard of transactions involving the sale of at least 3000 tons, but are without particulars as to price and terms, therefore do not report them in our list. The miners' strike in the Lake Superior ore region has ended, the miners going to work at the old rates. There is considerable inquiry for Forge Iron, and some persons expect a much more active demand before many days. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

300 tons gray forge	$27·00—5 mos.
150 tons, a mixed lot	25·00—4 mos.
120 tons gray forge	27·00—4 mos.
100 tons gray forge	26·00—cash.
100 tons gray forge	27·00—4 mos.
100 tons No. 2 foundry	27·00—4 mos.
80 tons No. 2 foundry	27·50—4 mos.
50 tons close and mottled	24·00—cash.
40 tons No. 1 foundry	27·00—cash.
30 tons No. 1 foundry	29·00—4 mos.
20 tons No. 1 foundry	28·00—4 mos.
10 tons foundry	29·00—4 mos.
10 tons foundry	30·00—4 mos.

ANTHRACITE.

100 tons gray forge	$27·00—5 mos.
100 tons gray forge	27·00—4 mos.
10 tons No. 1 foundry	30·00—cash.

MUCK BAR.

200 tons muck bar	$44·75—cash.
250 tons muck bar	44·50—cash.

CHARCOAL.

15 tons No. 1 foundry Hanging Rock.	$38·00—cash.

CONNELLSVILLE COKE.

500 tons gray forge	$26·00—cash.
20 tons No. 1 foundry	30·00—4 mos.
10 tons No. 2 foundry	28·00—4 mos.

CLEVELAND.

Messrs. READ & DICKEY, Iron Brokers, under date of August 10, write us as follows:

PIG IRON.—The market continues dull and inactive for Charcoal, Bessemer and Foundry grades, with a tendency to lower prices, excepting in the cases of Foundries from Black Band Ore. The calls for Gray Forge are numerous. Market active and firmer, owing to the improved demand from the East, West, North and South for Bar Iron. The strike among the Ore miners in the Lake Superior region is at an end, although in several instances the miners are working with a reduced force. We are informed by parties just returned from an extensive tour through that country, that the stock of Ore on hand at present, at the mines, in a majority of cases, is very light, and the output from this time forward to the close of navigation will not exceed fifty per cent. of amount mined in same time last year.

CHARCOAL PIG IRON FROM L. S. ORE.

Nos. 1 and 2 Foundry	$38·00—4 m.
Nos. 3 and 4 Car Wheel	40·00—4 m.
Nos. 5 and 6	43·00—4 m.
Bessemer Metal, Charcoal	38·00—4 m.
Bessemer Metal, Bituminous	30·00—4 m.

BITUMINOUS PIG IRON FROM L. S. ORE.

No. 1 Foundry	$30·00—4 m.
No. 2 Foundry	28·00—4 m.
No. 1 Gray Forge Red Short	28·00—4 m.
No. 2 Gray Forge Neutral	27·00—4 m.
White and Mottled	26·00—4 m.

PIG IRON FROM BLACK BAND ORES.

Massillon No. 1	$33·00—4 m.
Massillon No. 2	31·00—4 m.
"New Garfielderrie" No. 2	33·00—4 m.
Muck Bar	$44·50 @ 45·50—60 days.

MANUFACTURED IRON.—Orders are coming in more freely than for last two weeks, and prices hold up very firm. Buyers have reached the conclusion that the "bottom" has been touched, and passed, and seem better satisfied now to buy at an advance of 1-10 from what they could have done a month since, than to have given their orders at that time. They report generally a better feeling throughout all branches of trade and industry, and can sell more from their stocks, even at the advance, than during the early summer. Bountiful and well secured crops are having their inevitable effect in improving business and "redistributing the currency." The volume of new wheat going forward is already so great that eastward bound freight, by steam on lakes, are firm at the highest figures of the season, which, as one of the "signs of the times," tells an encouraging fact of an improvement in the commerce and business of the whole country. Many mills that were idle in June and July are now running "double turn," and with the English market showing a better tone and higher figures, our neighbors across the lakes are again sending us orders, and as we "have enough, and some to spare," we are pleased to send the "useful" for the "precious" metal.

NAILS continue about as quoted in our last, with factories fairly supplied with orders. The Nails made in the "Western country," are being introduced in the East and South, and in Canada, and give good satisfaction. We learn of a sale of 100 tons of Nail Plate to a Montreal manufacturer, from a mill in the Shenango Valley. The quality being regarded superior to the English, went far toward consummating the sales.

Prices from store here as follows:

	Rates 60 days.
Bar, Band and Hoop Iron	2·7c
Sheet Iron, No. 24	4·6c
Nails, 10d. to 60d	$3·60
Ship Spikes, ⅜ and larger	$4·25

BOSTON.

BOSTON, Aug. 8.—The Iron market has enjoyed the presence of a number of large foundry men during the week, in town for the first time in a month, "because the cool days and nearness of fall suggest the probability of renewing their blasts." The amount of business resulting has been small, though to start the thing they seem to have secured a shading on the odd five and ten ton lots they wanted, and in conformity to actual business we lower Eglinton $2 per ton. The stove makers have started up quite busily, but not with preparations for the usual amount of casting. House, factory and store repairs are being made very freely, which, on architectural work, is somewhat pleasant. In the range of small castings for machinists and factories a better business is coming along, so that most of the large furnaces throughout New England can run a blast once or twice a week, while the small ones fire up daily. There is small encouragement in Bar Iron and Steel. The trade wants are wholly trifling job lots, and possibly the situation is best expressed by the remark of a prominent dealer, who has been on the road for two weeks, that two-thirds of the country forges are idle, and the carriage men have no heart for undertaking sleigh work. We quote yard lots of American Pig Iron at $36 to $40 per ton, including No. 2 extra at $34 to $36, and No. 1 at $36 to $38. We quote Eglinton at $38, Coltness and Gartsherrie at $45 to $46, Charcoal at $45 to $55. American and English Refined Bar Iron is selling at $65 to $70 per ton for the ordinary sizes, and $85 to $90 for extra sizes, according to size. Cast Steel is selling at 16c., gold, for English, 18c., currency, and 15c. to 16c. for American, currency, with fancy brands of English selling at 17c., gold. Anchors are selling at 8c. per lb.; Chain Cables (⅝ to 2 inches thick), 5¼c. to 7c. per lb.; Coil Chains, from ·3-16 to 1¼ inches, 7c. to 15c. We quote Boiler Plates at 6¾c. to 7½c. for Flanges, 4¾c. to 5c. for C No. 1, and 4¼c. to 4¾c. per lb. for Common and Tank. Russia Sheet is selling at 16½c., gold, and 18c., currency, for perfect lots. English and American do. are selling at 5½c. to 7c. per lb., currency. We quote Galvanized Sheet Iron, No. 20, at 9½c.; Nos. 21 to 24, 10½c.; 25 and 26, 11¼c; 27, 13c.; 28, 13½c. Nails are selling at $4 for 10d to 60d, and other sizes at a range of $4 to $8 per 100 lbs., net. Horse Nails, 28c. for No. 7. Metals are generally lower, with very little business. Copper has been excited by the statement of mining companies and the rumors of the stock market, and while we drop quotations on Ingot to 20c., we have reliable statements that lots have been offered at 19c. and refused; buyers offering 18½c. In the stock market the situation is considered critical. The consumption of Copper in the United States is 30,000,000 pounds yearly. There is represented to be a stock of 20,000,000 pounds now unsold, and with a dull business for the year out, operators refuse to see anything better for Copper for the next two months than 20c. Dealers are very undecided, but even at the low quotations we hear of little legitimate business. We quote Ingot at 20c.; Sheathing, 33c.; Yellow Metal, 23c. *Lead* is lower. We quote Sheet and Pipe, 8c., currency; Tin-lined Pipe, 16½c.; Bar Lead, 7½c., less usual trade discount; Pig, 6⅝c. for foreign, gold, and 6¼c. for foreign domestic. *Spelter* is dull; sales 10 tons at inside quotations. American, 6⅞c. to 7⅛c., currency. *Tin* is easier. Straits at 23c.; Refined English, 21½c., gold. Charcoal I. C., $11·50 to $12; Coke, $9 to $10; and Terne at $8·50 to $12·50 per box, currency.—*Commercial Bulletin.*

CINCINNATI.

Messrs. ADDY, HULL & CO., under date of August 10, write us as follows: There has been a fair inquiry for Hot Blast Iron during the past week, which has resulted in considerable sales. Prices have not advanced, but there is a growing inclination among sellers to hold, in the anticipation of better figures for the fall trade. In the demand for Car Wheel brands there has not been any perceptible improvement, and quotations must be considered to a great extent nominal.

HOT BLAST CHARCOAL.

Hanging Rock	No. 1..₱ ton..	$34·00 @ 35·00—4 mos.
" "	No. 2.....	31·00 @ 33·00—4 mos.
" "	Forge.....	29·00 @ 30·00—4 mos.
Tennessee	No. 1.....	32·00 @ 33·00—4 mos.
"	Forge.....	29·00 @ 30·00—4 mos.
Alabama	No. 1.....	32·00 @ 33·00—4 mos.
Missouri	No. 1.....	34·00 @ 35·00—4 mos.
"	No. 2.....	31·00 @ 33·00—4 mos.

HOT BLAST STONE COAL.

Missouri	No. 1..... ₱ ton..	$32·00 @ 33·00—4 mos.
"	Forge.....	29·00 @ .. —4 mos
Ohio	No. 1.....	30·00 @ 32·00—4 mos.
"	Forge.....	25·00 @ 29·00—4 mos.
Scotch Pig,	No. 1.....	.. ..

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	₱ tn.	$50·00 @ 55·00—4 mos.
Missouri	" "	48·00 @ 52·00—4 mos.
Kentucky	" "	50·00 @ 55·00—4 mos.
Tennessee	" "	48·00 @ 52·00—4 mos.
Georgia	" "	48·00 @ 52·00—4 mos.
Alabama	" "	48·00 @ 52·00—4 mos.
Machinery and Forge	.....	45·00 @ 48·00—4 mos
Blooms	.....	90·00 @ 95·00—4 mos.

LOUISVILLE.

Mr. GEO. H. HULL, under date of Aug. 10, writes us as follows: There is more inquiry for Hot Blast Irons and prices are firm at quotations. Cold Blast is dull. Red Short Mill is scarce, and prices have advanced. Quotations are revised as below. The usual time, 4 months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores.	$33·00 @ 34·00
" 2 " " " " ..	30·00 @ 31·00
" 1 Forge, " " " ..	27·00 @ 28·00
" 1 F'dry, from Tennessee Ores.....	32·00 @ 33·00
" 2 " " "	28·00 @ 29·00
" 1 Forge, " "	26·00 @ 27·00
" 1 F'dry, from Alabama Ores.	32·00 @ 33·00
" 1 " " Iron Mountain Ores.	34·00 @ 36·00

HOT BLAST STONE COAL.

No. 1 F dry, from Missouri Ores.....	33·00 @ 34·00
" 2 " " " ..	30·00 @ 32·00
" 1 Forge, " " " ..	29·00 @ 30·00

COLD BLAST CHARCOAL.

Car Wheel	from Hanging Rock Ores..	50·00 @ 54·00
"	" Tennessee Ores....	46·00 @ 48·00
"	" Alabama Ores.....	48·00 @ 50·00
"	" Georgia Ores.....	48·00 @ 50·00
"	" Missouri Ores.....	46·00 @ 48·00
"	" Kentucky	48·00 @ 50·00

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of August 11: This market remains much as reported for the past few weeks. Trade rules fair and improving for the season, and we report the market firm at quotation figures.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ¾ to 1 thick.. } 1 to 4½ wide by 1½ to 2 thick }	2·9 to 3·1 cts. per lb.
Round and square, ordinary sizes, from ⅝ to 2 inclusive	2 9-10 to 3 1-10c. "
Hoop Iron, 1¼ wide and upward..	4¾ to 5c. "
Band Iron, from 1¾ to 4 in. wide..	4 to 4¼c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick.....	4½ to 5c. "
Norway Nail Rods.....	7¾ to 8¼c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes.....	16½c. "
Machinery Steel.....	11½c. "
Cast Spring Steel.....	11c. "
Homogeneous Steel Plate.	13c. "
Perkins' Horse Shoes, per keg of 100 lbs.....	$5·87½
" Mule Shoes " "	6·87½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails..	23	24	25	26	28c.	per lb.
	10	9	8	7	6	
Globe Horse Nails..	23	24	25	26	28c.	per lb.

R. R. Spikes.....5⅝ by 9-16 at 3¾c to 4c. per lb.

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger, Spence & Co., London, Glasgow and Manchester, under date of July 25, 1874, report:

Metals.—Inactivity pervades most branches of the metal trades, and with the exception of an improved demand for Pig Iron there is no feature of moment to note. There is a good business doing in Yorkshire Pigs for prompt delivery, and 66/ per ton has been paid for No. 3 Foundry, principally for shipment. Makers are now pretty fully engaged for the bulk of their make for this and next month, and are making quotations onward to the end of the year, but there is no disposition amongst merchants to speculate, and consumers will not cover much beyond their immediate requirements. The market for Scotch Pig since Tuesday has been exceedingly brisk, and an advance of about 5/ per ton is to be noted. The shipments for the week ended the 18th instant, show a small increase of 79 tons, being 9944 tons, against 9865 tons the corresponding period of 1873. The same week in 1872 they were 17,108 tons. In South Staffordshire some furnaces have been relighted, and in North Staffordshire the works are fairly employed. From many parts of the country, however, there are complaints that the intense heat of the weather and a scarcity of water interfere with active operations in the iron works. The Tube trade is uniformly dull, and cheaper supplies of raw material are necessary before any improvement takes place. In Copper, Chili Bars have somewhat improved, and British has assumed a firmer aspect. Tin has been irregular. English Ingot continues merely nominal, and of foreign, sales are light. Lead without change. Spelter dull.

IRON.—"Ayresome" Yorkshire Pig Iron, prices from September to December inclusive, No. 1, 70/; No. 2, 65/; No. 3, 62/6; No. 4 (Foundry), 60/; net cash, or 1/ extra 4 months' bills. Scotch Pig, Warrants, 85/ to 86/. Staffordshire Bars, £10 to £12. Hoop Iron, £12 to £13. Gas Tubes, 62½ per cent.; Fittings, 67½ per cent. off list. Boiler Tubes, 30 to 35 per cent. discount.

COPPER.—English Tough Ingot, £84 to £85. Chili Bars, £77 to £77. 10/.

TIN.—English Ingot, nominal, £97 to £98. Straits, £95 to £96.

TIN PLATES.—Best Coke, I. C., nominal, 27/ to 34/; Charcoal, I. C., 35/ to 41/ per box.

LEAD.—Best English Soft Pig, £21. 5/ to £21. 10/. Refined Red Lead, £23 to £24.

ANTIMONY.—French Star, £49 to £51.

SPELTER.—Silesian, £22 to £22. 10/. English, £23.

SHEET ZINC.—£28. 10/; Perforated, 3¼d. per foot super 10 per cent.

FOREIGN.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, July 26, 1874.—*Copper*—The uneasiness created by the big sale of Copper from Lake Superior on the Continent has gradually subsided, and the dealings in the various European markets, especially in England, have been on a more extensive scale. The immediate consequence there has been a rise in Bars of 30/, but consumers have little confidence in the market, and, as they operate sparingly, the improvement in Chilean does not benefit English Copper. Our own (Paris) market is quiet. The future course of prices remains undecided, and until the expected charters shall become known, not much change can be looked forward to. The decline in the standard of Copper tends somewhat to check the amount of business, which might otherwise be done at rates now current. In some of the leading markets there at one time appeared signs of a movement on the part of some operators to effect an improvement in prices, but no general support was lent to it, and in the same manner as has frequently been the case of late, it proved abortive. The period we are at present wading through in industrial matters is ill adapted to speculations in metals, and whenever attempted, especially on a large scale, similar operations are bound to end in failure, unless business should all of a sudden become brisker than we have any sound reason to hope. At all events, consumers would show little disposition to follow up the market, were any attempt made to spring upon them a speculative mine in Copper. There is, consequently, no help but to keep cool—as much so, at least, as the season permits us to be, and patiently wait for better times, when, through the instrumentality of legitimate consumption, we may return to our wonted activity in trade matters. We quote Chili Bars 205 francs; Common do., 198; Ingots, 215; and English Tough Cake, 215, while pure Corocoro Ore commands but 202·50. Havre has been following in the wake of English fluctuations, and closes rather nominal, first brands 205 to 207·50, good current 202·50, and Lota and Urmeneta 197·50. The feeling is a little better, while we write upon more favorable English news, and 2895 bags pure Corocoro Ore have been sold at or about our quotations. Marseilles has been weak; Chili Refined Ingots at 220 francs; Copper Sheathing at 230 to 245; Old Copper, 190. *Tin.*—Transactions in this metal have been limited in extent; the course of prices, uniformly downward at the leading centers of distribution, has not stimulated consumers to action. In England this is mainly due, probably, to the disorganized condition of the Tin Plate manufacture. These works were originally stopped by the strikes, frequently referred to, but the low stage at which rivers, streams and rivulets have arrived in consequence of a prolonged drought, now prevents many from among them from resuming work in earnest, and the demand for Tin is curtailed, causing Straits Tin to recede to £95 at London, and Banca to £98. Tin Plates in the English market have been looking up, without being over active. News had been studiously spread at the same time that unusually large quantities of Tin were mined in, and coming forward from, Australia, but we cannot trace this English intelligence to a reliable source. As it is very little believed in trade circles that there is any over production in that part of the world at present, such intelligence has no effect upon the European markets in general. Not much doing here, and prices unaltered. We quote Banca, deliverable at either Havre or Paris, 260; Straits, 255; English, at Havre or Rouen, 252·50. Marseilles is but faintly supported, Straits at 260. *Lead.*—The European Lead markets bear up ordinarily well against the evil influences of protracted industrial stagnation. Inquiry, it is true, is limited, yet the trade at large full well understand the favorable position of the staple, and prices are steadied by a stout faith in its more immediate and even remoter future. A strong undercurrent of confidence as regards the metal is observable at Paris, and French commands 53½. Our correspondents at Marseilles, though speaking of great firmness, express their unbelief in higher prices. Some resales have taken place on the basis of 54. *Spelter* has, on the whole, been quiet, particularly in England, where little transpires for export. The market here is quiescent and hesitating at between 57 and 57·50 here and at Havre. Marseilles is unaltered. Accounts from our *Iron* districts vary a good deal; in some quarters, at the North for instance, an improvement is announced, and Wrought Iron is advanced in value 10 francs per ton by makers, without any apparent inclination on the part of consumers to subscribe to this new price list. Some people in the Loire district seem well contented and have plenty of orders, while others still complain. England, meanwhile, is getting into full working trim once more. We should guard against becoming sanguine on the subject of values that are to rule, as there is plenty of powerful competition at hand. Fortunately every thousand kilometers of Rail to be laid under the new plan traced out by the government, involves 100,000 tons orders to manufacturers, and exclusively to domestic ones, under the high protection we enjoy. *Coal* is quiet and unchanged, production is curtailed, and will not be fully resumed till a clearer insight into the more immediate future be obtained.

BELGIUM.

(*Le Commerce.*)

BRUSSELS, July 25, 1874.—*Iron.*—The market continues rather inactive; there is plenty of inquiry without leading to much being done. Manufacturers clearly see that they should lay in stock at prevailing rates, but hesitate in the replenishment of the necessary supply for reasons in part individual and in part general, such as a feeling of apathy still ruling the minds of most people. Any very great improvement need not therefore be looked for as likely to occur soon, despite the firm aspect of the Pig Iron markets. Rolling mills keep up a show of activity, being from all appearances resolved to go on producing, even though they made no living profits. England, with its varied resources, is comparatively better off than Belgium. Even during the most intense prostration there, the shipbuilding and engineering departments of the Iron trade have afforded substantial support to the market, and continue steady. An impression seems to prevail, on the part of manufacturers across the channel, that both Iron and Coal will soon rule lower instead of higher, and some check is exercised on Continental markets by similar predictions. There is a good outlook abroad. Accounts from Australia, the United States and Canada, Russia and Spain, are generally most encouraging as regards the autumn business, and a good many commands are being received in England from those quarters, especially Spain, where railroad bridges, blown up during the civil war, are being rebuilt. Let us hope that Belgium may have a share in future orders from similar sources. *Coal*, with the sole exception of some privileged mines, is doing but indifferently well. Less orders are dropping in, and prices do not show the same degree of firmness which they exhibited but a short time ago. Futures to the close of the year are rather below than above official price lists; but in spite of this state of affairs some mines in Central Belgium and at Charleroi have taken it into their heads to meditate a general rise of prices. They are mistaken, if they expect little resistance from consumers, and may feel assured that neither the Liege mines, nor those of the Ruhr and Sarre will imitate the example. Aside from this, production, which had been checked from various causes, is now about being fully resumed, and the river shores will soon be well lined with Coal in view of the approaching severer season. No change in prices.

GERMANY.

(*Borsenhalle.*)

HAMBURG, July 26, 1874.—*Copper.*—No particular change has taken place in this metal in the various German markets. Berlin has been tolerably firm, good quality English and Australian selling at 28 to 28¾ thalers. Stettin is steady at 29 to 32. We have been rather weak here, some lots of Dronthheim and Atoidaberg changing hands at 89 marks. *Tin.*—The dealings have been of a retail character, for consumption, merely; there is a total absence of speculation and rates are steady. Berlin is well sustained at 35 to 35¼ thalers for Banca, and English Refined at 34 to 34¼. Prices here have been tolerably well supported—Banca at 1·10, and English at 1·08 to 1·10 marks. *Lead* might have been brisker. Such as it is, the demand has been fair, and we can advise fully sustained prices. Berlin is quiet at 7¾ to 7¾ thalers the 50 kilos for Tarnowitz, Hartz and Saxonian. Stettin is inactive at 8¼ to 9 for Spanish and 8¼ for German. We are steady here at 25 to 25¼ marks for German and English. No features of note have marked the German *Spelter* market. The dealings have been light and prices have remained without further change.

HOLLAND.

(*Evers & Co.*)

ROTTERDAM, July 25, 1874.—The *Tin* market is remarkably quiet. Banca, spot, has been done at 57½, and from the impending government sale at 56½ to 56¾ guilders, from the September auction at 56½, while spot Billiton brought 56, and subsequently 55¼.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, Eng., July 27, 1874.

THE STATE OF TRADE GENERALLY

is not very different to what it was at the time of my last writing, a week ago. Some people are inclined to take a hopeful view of the situation, and express their conviction that if the American fall trade should turn up all right, the winter will be got over nicely and we shall steam ahead again in the ensuing spring. These optimists are, I should say, becoming numerous, and are of so good a business cast that their opinion will presently be entitled to considerable respect. Then we have the doubters—a feeble, faultfinding, grumbling set of manufacturers and traders, men who never bring themselves to believe in the stability of anything, and who are by no means satisfied, at any time, with the current state of business. If trade is brisk, these good people are quite certain it won't, it *cannot*, last. If it is moderately good, they opine that things are not as they once were when they turned out so many dozens or so many tons of "stuff" per week, and, "what with one thing or another," they would'nt take a deal of persuading that we shall soon loose all our trade to the benefit either of the piratical Germans or the "cute" Americans. When trade falls dull, quiet, "dead as ditch water," then are our friends, the doubters, in full force. Nay, they excel themselves; for if they grumbled and were querulous from mere habit before, they are now in fair earnest, and add to habit the keen edge of actual feeling. Just now these people are in the throes of what I have last indicated. They hardly know what to be at next—especially in the Sheffield cutlery trades, in which industries, I am bound to admit, there is just now plenty of room for a little hearty grumbling. A third section of the business community holds a widely different opinion to either of those above mentioned. I refer to the section which embraces within its limits the pushing, keen, far seeing men who direct the affairs of the greater concerns of this kingdom. Of such were the elder Mr. Crawshay, Sir John Brown, Peter Fairbairn, Richard Barrow, and not a few others, most of them giants in energy, not slow to encourage invention, persevering in everything, and adepts in that business foresight which has led to the founding of enormous undertakings and the furthuring of some of the greatest enterprises the world has ever yet witnessed. Men of this stamp regard the present state of affairs as a perfectly natural and inevitable sequence to the events of the last three years, and they are also well aware what remedy is needed. No body of men, however, can either forestal time or force events

forward out of their natural order. Still there is the remedy, and it must be relentlessly worked out before the British iron trade can hope to recover and retain with a firm grasp its supremacy in the markets of the whole world. What the remedy is does not need to be dilated upon. Cheaper—and not a *little* cheaper—fuel, lower wages, economic working, and a full and free use of both machinery and chemistry, are its chief features, and with these well developed Great Britain may hope to hold the world at bay for many years yet to come—until, in fact, the young western giant is enabled to feel his strength and exercise it in the plentitude of all the immense resources planted in the soil by nature.

THE IRON AND STEEL INSTITUTE.

I observe an announcement that the autumnal meeting of the Iron and Steel Institute, at Barrow-in-Furness, will commence on Tuesday, September 1st, and will continue during the three following days. On the Wednesday, after the reading and discussion of the papers to be submitted, the members will visit the Barrow Steel Works, the ship yards and engine works, and in the evening will be entertained at dinner by the Barrow Hematite Steel Company. On Thursday, after the business meeting, excursions to the various mines and works in the neighborhood of Barrow will be organized, and Friday will be wholly devoted to excursions to the more distant works. It has been arranged that members during the period of their visit shall be allowed to travel free over the Furness Railways, and special trains will be provided for conveying them to the various places.

BRITONS NEVER, *never* SHALL BE SLAVES!

A few days back an instance of the terrible degradation and misery caused in the ranks of the working classes of this country, by the habitual use of intoxicating liquors, came before the Sheffield public. A puddler earning over 50/ per week, and his wife, were summoned for neglecting their family; the relieving officer found the "home" of this wretched couple to be one room, the furniture being a bucket, fender and chair. One child was lying naked on a heep of coals, and another had hardly anything on. The father was in a beastly state of intoxication, and the mother so drunk that she could not hold the baby in her arms. This was a sad picture, but I am afraid that hundreds, nay thousands, of such "homes" are scattered broadcast over this exceedingly prosperous country.

THE SCOTCH PIG IRON MARKET

has stiffened considerably since the date of my last letter, mainly owing to a very material diminution of stock, consequent upon a generous shipping demand, aided by the least possible suspicion of speculation. On the resumption of business at Glasgow, after the local fair holidays, which lasted several days, a better business was done. The amount of it may be gauged by the fact that the stock in Messrs. Connal's stores is to-day only 29,600 tons, as against 40,000 tons this day month. Shipments this week are again on a somewhat larger scale than in the corresponding week of 1873.

Messrs. William Colvin & Co., Glasgow, 28th July, 1874, report as under:

"There has been a very good demand for pig iron during the past week, chiefly for foreign shipment, and a decided advance has taken place in all descriptions. Warrants steadily rose until yesterday afternoon, when 88/3 was paid, but this forenoon a reaction took place to 86/6, at which one or two lots changed hands, but during the afternoon the tone became again very firm, and there were buyers at 88/6 at the close. There is a marked scarcity of the favorite brands, and a serious reduction is still taking place in the stock in store. We subjoin approximate prices of the various brands."

	Deliverable alongside. No. 1.	No. 3.
G. M. B., at Glasgow	91/6 to 92/6	86/ to 87/6
Gartsherrie, "	115/	90/
Coltness, "	117/6	...
Summerlee, "	115/	90/
Carnbroe, "	100/	90/
Monkland, "	95/	87/6
Clyde, "	95/	87/6
Govan, at Broomielaw	92/6	87/6
Langloan, at Port Dundas	115/	90/
Calder, "	115/	90/
Glengarnock, at Ardrossan	100/	87/6
Eglinton, "	93/	87/6
Dalmellington, "	93/	86/
Carron, at Grangemouth, selected	105/	85/
Shotts, at Leith	110/	90/
Kinneil, at Bo'ness	92/6	87/6
Bar Iron	£10. 10/ to £11.	
Nail Rods	11	

From the weekly prices current of Scotch pig iron, issued by Messrs. John E. Swan & Bro. (limited), Glasgow, on July 24, I cull the following:

Glasgow Brands.	Furnaces Blowing, 47	Furnaces Out 82.	Furnaces Built, 156.	Prices. No. 1.	No. 3.	No. 4
Gartsherrie	5	11	16	112/6	89/	..
Coltness	6	6	12	..	..	..
Summerlee	3	5	8	..	87/6	85/
Langloan	3	5	8	..	87/6	87/6
Govan	4	1	5	88/6	86/	..
Calder	6	2	8	*112/6	88/6	..
Shotts { Bess'mer	3	4	7½	100/	95/	..
Shotts { Ordinary				107/6	87/6	..
Carnbroe	3	3	6	97/6	87/6	..
Wishaw	2	1	3	..	..	..
Monkland	4	5	9	90/	85/	..
Chapelhall				..	..	..
Clyde	3	3	6	..	86/	..
Quarter-Clyde	2	2	4	..	86/	..

*f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5, No. 1; 2-5, No. 3, g. m. b. 86/6.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock	3	6	9	97/6	86/	86/
Ardeer	2	3	5			
Eglinton	4	4	8			
Lugar	4	0	4	90/	87/6	87/6
Muirkirk	3	0	3			
Portland	0	6	6			
Dalmellington	3	5	8	86/	84/	74/

EAST COAST BRANDS—*f. o. b. in the Forth.*

Kinneil	2	2	4	90/	85/	75/
Almond	2	1	3	85/	..	..
Carron { Selct'd	4	2	6	105/	..	..
Carron { Ordn'y				95/	..	..
Lochgelly	2	2	4	85/	82/6	72/6
Lumphinnans	1	1	2	82/6	80/	72/6
Bridgeness	0	2	2	..	..	..

Almost all kinds of Scotch manufactured iron have recently been reduced in price, but orders have not flowed in at all rapidly since the drop was made. Some few of the leading pipe founders are, nevertheless, fully occupied on foreign orders.

CLYDE SHIPBUILDING TRADE.

There is not nearly so much doing in the shipbuilding yards on the Clyde as has been the case during the past three or four years. I quote an excerpt, which states that "at the end of March there were fully 100 vessels on the stocks, and at the end of May the number was reduced to 73, while the half year closed with scarcely 60 vessels building. The completion of orders received twelve months ago, and the building of a few sailing vessels, the demand for which has recently sprung up, is the work with which builders are chiefly employed. The contracts recently closed have been very few, and chiefly for small steam vessels, which six months ago would have gone elsewhere. The unusual number of large vessels launched during the last month has considerably altered the appearance of the shipbuilding yards. During the period mentioned no fewer than four steamships, of 3500 tons each, or 14,000 tons aggregate, and all for the trans-atlantic trade, have been sent from the yards during the period named. As in the preceding month, a large number of sailing vessels have also been launched, the tonnage of the five ships which left the stocks during June being fully one-half the total number of sailing vessels launched in 1873. The dullness in freights for steam vessels, which has succeeded the recent brisk trade, has stopped all demand for new steamers, and it is feared that about a third of the trans-atlantic steam fleet will soon be laid up, until the spring months, at least; there is but little prospect of a revival in the shipbuilding trade. The number of vessels launched during June is about an average, but owing to the large size of vessels, the tonnage exceeds that of any previous month, the total being 17 vessels of 35,000 tons. This aggregate is 3000 tons above that of March last, which was the highest total tonnage of previous months of this year, and 5000 tons above March, 1872, and 11,000 tons above May, 1872, when the largest amount of tonnage was launched for these respective years. On looking at the half year, however, there is a decrease of 4400 tons as compared with the same period in 1873, but it exceeds by 21,000 tons the first half of the year 1872."

CUMBERLAND, THE BARROW DISTRICT.

The trades of this locality remain very quiet, as a whole, and prices have reached a point which is, comparatively, very low. Maryport nematite pig is priced: No. 1, 95/; No. 2, 95/; No. 3, 95/; No. 4, mottled and white, 95/. Bessemer, No. 1, £5; No. 2, £4. 17/6; and No. 3, £4. 15/ per ton, less 2½ per cent. for cash. Millom hematite pig iron is now quoted as follows: Bessemer, No. 1, £4. 15/; No. 2, £4. 12/6; and No. 3, £4. 10/; ordinary No. 3, £4. 10/; No. 4, £4. 7/6; No. 5, £4. 7/6; mottled, £5. 5/; and white, £5. 5/.

THE CLEVELAND DISTRICT

is improving somewhat, pig iron having gone up a few shillings per ton during the week. Makers are stated to be tolerably well sold forward, and stocks are going down very nicely—a consequence of the decreased production caused by the miners' strike. Foundry pig is in good demand, No. 1 at 76/; No. 2, 71/; No. 3, 67/6; and No. 4, 63/6 per ton. Orders for finished iron are still very scarce. Several works are still altogether closed, and the bulk are only able to make part time. American rails of 50 lb. to 60 lb. per yard are £7. 15/ to £8, f. o. b. in the Tyne or Tees. The plate makers are rather better employed, the local shipbuilders being well engaged on contracts, which have been taken at £3 to £5 per ton less than the prices quoted last year. At the Elswick Works (Sir William Armstrong & Co.) a 100-ton gun is being constructed. It will probaoly be the largest of its kind yet built.

TRADES OF SHEFFIELD AND SOUTH YORKSHIRE.

The miners' strike cannot be said to be settled as yet, although it is, apparently, in a fair way of being so disposed of. After my last report was written the two secretaries of the Miners' Association forwarded a long and courteously worded circular to the coal owners of both the South Yorkshire and North Derbyshire districts, in which they detailed the steps taken in the matter by themselves and the delegates, concluding by expressing a hope that the owners would see their way to assenting to a drop of 10 per cent. This circular and other cognate matters came before a very largely attended meeting of coal owners at Doncaster on Saturday. Mr. Charles Bartholomew again presided, and the whole of the leading collieries in both counties were represented Earl Fitzwilliam, who is a large coal owner, wrote agreeing with what had been done up to that time. The meeting again went very fully into the matter, and after deliberating about an hour and a half, a resolution was passed accepting the proposition that the men resume work at 10 per cent. reduction, and referring the question of the further 2½ per cent. to arbitration. The owners will, in all probability, name Mr. Robert Baxter—of Baxter, Rose & Norton, London—as their umpire, and the men Mr. Burt, M. P., or Mr. Macdonald, M. P. In case they cannot agree an umpire will be called in.

This would, on the face of it, appear to be an amicable settlement of what had threatened to be a serious dispute, but it is a matter for regret that in many of the villages and towns there is a disposition not to abide either by the result of the arbitration or by the action of the acting council of the association. As an instance of this hostile feeling I may cite a mass meeting of about 3000 persons, chiefly miners, which took place at Wombwell, on Tuesday afternoon. Messrs. John Normansell and S. Casey, the two secretaries, were soundly rated for their advice—to accept the reduction—and a threat that they, the miners, must have money or they "would put Messrs. Normansell and Casey to great inconvenience," was loudly cheered by those present. The chairman of the meeting stated that the money must be got, even if the colliery they had bought had to be sold, and the houses near it mortgaged! There was great cheering at this proposition. At the close of the meeting a vote of censure was unanimously and enthusiastically passed upon the officials and executive of the association. A further meeting, with a similar result, was held at Barnsley on Wednesday.

I regret to observe that, in some parts of the district, the men on strike are inclined to be riotous and violent. On Monday, for instance, a large number of both men and women set upon 25 men in the employ of the Manchester, Sheffield and Lincolnshire Railway Company, who were loading coals at the Edmund's Main pit, and stoned them so vigorously that they were afraid to continue work. A body of police afterward arrived for their protection.

At several of the collieries preparations are being made for the resumption of work, and the number of men on strike is smaller than at this time last week. There has been some little difficulty in obtaining coke, but it has not been of an insuperable nature, a slight advance in prices having proved sufficient to bring in a fairly good supply. At some of the ironworks much inconvenience has, nevertheless, resulted from the stoppage of the supply of coals.

The whole of the Sheffield trades remain very quiet, notwithstanding somewhat easier quotations for several classes of goods. Files and saws do not meet with a very encouraging sale, particularly the smaller descriptions. Large and medium sized circular and frame saws are in moderately good demand for exportation to Norway, Sweden and Russia, and other timber growing countries. Edge tools are hardly so so much sought after, chiefly owing to the satiation of the Australian market. Cutlery is so very quiet that it is an exceedingly difficult matter to acquire any new fact of interest in connection with or relating to it. So far as I am able to ascertain, some few of the American merchants are doing a moderately good business in shoe knives, butchers' knives, best ivory table cutlery and carvers, but find a limited call for almost all other classes of goods. To this I dare say Joseph Rodgers & Sons and George Wostenholm's are exceptions, the latter house having a good inquiry for spring cutlery and their special goods.

BIRMINGHAM AND SOUTH STAFFORDSHIRE.

Trade continues dull in Birmingham and the surrounding district. The home orders are pretty good for the season, but the export branch is exceedingly quiet, and merchants do not hold any prospect of an early improvement. Many classes of hardware goods have been put down 2½ per cent., and the list is daily growing; but the concession does not bring in any augmentation of business worth mentioning. The Birmingham *Post* reports that with, the exception of the brass and mixed metal trades, which have for some time past enjoyed extraordinary prosperity, the hardware manufacturers generally are anything but brisk. The stagnation in the iron tube trade continues unabated, and the demand for constructive iron work is exceedingly limited. The machine and tool trades, for the most part, are well employed still, but new orders are increasingly scarce. On the other hand, there is some improvement in the demand for iron beadsteads, and the manufacturers of stove grates and kitchen ranges are generally busy, in anticipation of the autumn demand. There is a fair amount of activity, also, in the harness and saddlery trades. The chandelier and gas fitting trades are dull, though some of the leading houses are well employed on special orders for private customers. Lanterns and carriage lamps are in good demand, and for carriage iron work, including springs, axles, tyres, &c, the orders in course of execution, both for home and export, are considerable. There is rather more activity than lately reported in the pin trade, and steel pen makers are all well employed. In the button trade the only special feature is the increased demand for ivory goods.

The same paper thus remarks on South Staffordshire iron matters:

"In the South Staffordshire district a slight improvement is apparent since quarter day in the demand for sheets, plates and hoops; but, on the whole, business must be reported quiet, the orders coming in being quite inadequate to furnish full and regular employment. The makers of branded iron are relatively better off than the inferior houses, yet few even of the former are making much more than half-time. Orders are still being held back in the expectation of a fall, which has only been delayed so long by the firmness and scarcity of coal during the miners' strike. Now that the strike is ended, buyers are in hopes that the increased output will soon compel the desired reduction in coal, so as to enable iron producers to bring down their standards to the requisite level of £10 for marked bars. Neither coal nor iron masters, however, give much encouragement to these hopes. The colliery owners declare the coal they are raising is little, if at all, in excess of consumption, and that they could not submit to any further reduction without a corresponding reduction in wages. Under the terms of the recent arrangement, however, wages cannot be reduced for at least three months, at the end of which time the winter demand will have come to the relief of the coal market. Meanwhile, prices are firm on the basis of 19/ for best forge coal. Iron ranges from £10 to £12 for bars, and from £13 to £14. 10/ for sheets. Pig iron is steady at £5. 15/ for best hot blast native all mine, and £3 to £3. 5/ for cinder. There is little present movement in this department, but in anticipation of the early revival of manufacturing trade, furnaces are being relighted in different parts of the district. The number of those in blast at present is 47, out of 153 erected."

FROM SOUTH WALES

comes reports of the most unsatisfactory nature one can possibly imagine. The ironworkers are again about to be reduced—probably by 20 per cent.—the exact amount to be fixed at a meeting of ironmasters which will be held in a few days. The whole of the colliers of South Wales and Monmouthshire have been served with notices of cessation of contracts. This, of course, heralds a reduction, which it is believed will be one of 10 per cent. to take effect on September 1st. Both the ironworkers and colliers are seceding from the national trades unions and are trying to form a Welsh union. Few of the works are doing one-fifth of their capacity, a correspondent instancing that "Gadsley's is silent; Abernant, nearly so; Cyrfarthfa closed; Dowlais, nearly stopped, owing to deficient water supply; Plymouth, only one furnace going and all the puddling furnaces out; Taff Vale, fairly busy on an exceptional order; Treforest, quiet, etc." Rails of "American" sections 50 lbs. to 60 lbs. to the yard are £7. 10/ to £8, f. o. b. Russian, 66 to 75 lbs. per yard, £7. 15/ to £8. 5/, f. o. b.; Steel Rails, £10 to £10. 10/ at the works. Tin plates are quiet.

THE METAL MARKET

has, in some respects, improved copper, for instance, being about £1 per ton better. On the other hand tin has declined in value, and lead has a downward tendency. Messrs. Von Dadelszen & North's report runs thus: "*Copper* has improved about 20/ per ton for Chili bars since our last report, and close upon 1500 tons must have changed hands this week, from £76. 10/ to £77. 10/, and £78, with extra prompt, closing, however, with a duller tone; Wallaroo nominally £88; Burra, £87; English remains dull. *Tin* has gradually declined; Straits has changed hands as low as £95, and Australian at £93. 10/; Banca is held for £100. The Dutch market is dull; spot, Banca, 57fl.; Billiton, 55½fl. to 56fl.; English common, £98. *Tin Plates.*—No change to report in prices; cokes are obtainable on easier terms. Nearly all the works are now open again. *Lead.*—Little business passing, and prices have a dull tendency. *Spelter.*—Weeks pass without any report of business, and it is difficult to quote prices within 10/ per ton. *Quicksilver* has been advanced to £21. 10/ per bottle."

Messrs. Kelly & Co.'s report: "*Metals.*—Antimony regulus, £48 to £49; *Copper*, tough ingot, £84 to £85; best selected ingot, £86 to £88; Chili bar, cash, £76 to £77. 5/; Chili regulus, 15/3 to 15/9 the unit; Wallaroo, £89. *Lead.*—English, soft pig, £21 to £21. 5/; refined red lead, £23. *Quicksilver*, nominal £20. *Spelter.*—English, best, £22; Silesian, £22 to £22. 10/. *Tin.*—English blocks and ingots, £101 to £102; refined, £104 to £106; Straits, £97; Banca, £100 to £101; Australian, £97 to £98; tin plates, best charcoal, I. C., 36/, nominal. Zinc sheet, £27. 10/ to £28."

Messrs. Warner, Walduck & Co.'s London circular, of July 22, quotes: "Ship, tank and girder rivets, £14. 5/ per ton; nails, from 20/ to 40/ per cwt.; common rolled brass to 32 W. C., 9½d. per lb.; brass gas tubes, 11¾d. per lb.; copper tubes, 12d. per lb.; brass wire, 9½d. per lb.; copper wire, 12d. per lb."

Messrs. French & Smith (July 25, London), say: "Business continues inactive. *Iron* unchanged. *Copper* firmer. *Tin* easier. *Lead* steady. Banca, £100 per ton; Billiton, £96 per ton; Straits, fine, £95 per ton; Straits, afloat or forward, £95 per ton; Australia ingot, £93. 10/ per ton; English refined, £100 per ton; English, common bars, in barrels, £99 per ton; English, common blocks and ingots, £98 per ton. *Tin Plates.*—Charcoal, I. C., 36/ to 41/ per box; coke, I. C., 28/6 to 37/ per box. *Quicksilver.*—Higher prices are asked."

The *Mining Journal* of the same date, has the following remarks: "*Copper.*—The market opened with some shade of improvement in the amount of business done during the early part of the week. On Monday last some 300 tons Chili bars, g. o. b., are reported to have changed hands from £76 to £76. 10, and the superior brands £77, all on cash terms. At the Swansea ticketing, ore of an average produce of 28½ per cent, or a little over, realized 15/ per unit. Cape ore 1¾d. higher, or a decline of about 10/ in the standard, as against last sale, g. o. b., advanced to £77. 5/. The improvement in the copper market has been steady throughout the week, and the amount of business transacted somewhat greater than it has been. The decline in the standard of copper tends somewhat to check the amount of business which might otherwise be transacted at current quotations. Tough, £83 to £84; best selected, £85 to £86; strong sheet, £90 to £91. India, 4 by 4 sheet, £89. Yellow metal 7⅝d. sheets, and sheating; and Chili bars, g. o. b., £77 to £77. 10. At one time there appeared signs of a movement on the part of some few operators to effect, if possible, a rise in prices; but it did not meet with general support, and, like many previous attempts of a similar kind, proved abortive. This is not the time for speculative operations; they are sure to end in failures, unless accompanied with a good legitimate business, either for consumption or shipment, neither of which at the present is more than adequate to existing rates. Consumers would be very indisposed to follow up the market, and the foreign markets would respond very feebly and slowly to enhanced prices on this side. *Lead.*—This metal continues very steady, and, notwithstanding that the demand is at the moment more than usually limited, there is no indication of quotations giving way. Good soft English pig is still obtainable at about £21. 5/, and Spanish lead, without silver, at £20. 15/ to £21. *Spelter.*—There is not much doing in this metal. Common Silesian, on the spot, was quoted £21. 10/ to £22. *Zinc.*—Of 160 tons London rolled, 130 tons were sold as follows: 125 tons at £26. 10/, and 5 tons at £26. 12/6. *Tin*—Throughout the week there has been but little doing in this metal, and although prices show a steady decline, yet buyers up to this time exhibit no disposition to come into the market; indeed, until the tin plate works are more actively employed than they now are—the works having been stopped first in consequence of the late strike, and now very generally by reason of the excessive drought, which has reduced the supply of water upon which many of the works depend for motive power—there does not seem much probability of any great improvement in the demand. Straits tin, £95; Australian, £93. 10/; Banca, £98 to £100. *Tin Plates.*—There is some improvement in inquiry, but actual sales are confined to very small quantities. *Quicksilver.*—Part of the week sellers declined to make any sales. It was ultimately advanced in price to £21.

American Institute Premiums.

The approaching exhibition of the American Institute will this year be divided into seven departments, classified as follows:

1. Fine arts and education.
2. The dwelling.
3. Dress and handicraft.
4. Chemistry and mineralogy.
5. Engines and machinery.
6. Intercommunication.
7. Agriculture and horticulture.

The awards are to be as follows: The Medal of Progress (of gold) is to be awarded only to the discoverer or inventor of a machine, product or process on exhibition, which shall be adjudged so important as to make a decided advance and great improvement, and be satisfactorily shown to be a discovery or invention of the first order of importance and value in science or in the industrial arts.

The Medal of Taste (silver) will be awarded to the person having the best art specimen on exhibition.

A second silver medal is to be awarded only for a machine, product and process of great value.

A bronze medal is to be given, upon a favorable report of a majority of judges, for a machine, product or process of great merit, but not of sufficient importance to deserve the silver medal. A diploma may be awarded for a machine, product or process of acknowledeged value, by a vote of managers. The Diploma for Maintained Superiority shall be granted for any superior article which, at the previous exhibition of the Institute, won the award of a medal. The Diploma of Continued Excellence shall be granted for any excellent article which has won the award of a medal at a previous exhibition of the institute.

The Co-operator's Diploma may be awarded by the Board of Managers to any employes who, by their skill, have added to the general attractiveness of the exhibition.

The Great Medal of the American Institute (of gold) is to be awarded only to the discoverer or inventor of a machine, product or process which shall have proved by long continued operation and practicable adaptation to be so important in its use or application as virtually to supplant every article or process previously used for the same purpose. In addition to the foregoing the Board of Managers are authorized to grant awards for the best specimens of workmanship and skill by apprentices; and may also grant to exhibitors of cut flowers, fruits or perishable products an award of money, plate or other valuable consideration.

It is confidently expected that the coming exhibition will receive most substantial encouragement from the South and West as well as from New York and adjoining States. Every facility possible will be offered exhibitors who choose to contest for the prizes offered.

Newark Industrial Exhibition.

The Managers of the Industrial Exhibition have issued the following circular:

Newark, by her exhibition, now occupies a position which she must maintain. She has accomplished what no other city has done. She has given an exhibition unequaled, of her own products exclusively, while the exhibitions of other cities have been open to the country at large. The excellence and completeness of her display on former occasions should be surpassed by the exhibit of this year. Every one who manufactures anything should place a sample on exhibition.

The Newark Industrial Exhibition will open on Tuesday, August 25, 1874, at the exhibition buildings, Marshall, Washington and Court streets. Goods will be received August 17.

Artists, inventors, manufacturers, machinists, producers prepare in time. Advertise your business without cost to the thronging multitude of visitors. Ample room for all kinds of Newark productions.

Steam-power for working machinery. Diameter of shaft, 2 7-16 inches, 150 revolutions per minute.

It is very desirable that machinery in motion, and the processes of manufacturing from the raw material should be prominent features of the exhibition, to which special attention is called.

NO CHARGE FOR ENTRY OR SPACE.

The attention of exhibitors is especially called to the importance of having a descriptive card attached to articles on exhibition, that visitors may be enabled to fully understand the nature of such goods in the absence of exhibitors—a want much felt in previous exhibitions.

All should file an application for the amount of space required with the secretary without delay, that the committee may be enabled to make its arrangements.

Those who have not received a blank application can obtain such of the secretary, No. 11 Mechanic street.

Interest your friends in this common cause, and see that all exhibit.

GEO. A. HALSEY, President.
A. M. HOLBROOK, Secretary.

Isabella Furnaces.

These furnaces, situated on the west side of the Allegheny River, about five miles from Pittsburgh, and on the Western Pennsylvania Railroad, are among the largest in the country. No. 1 Furnace (eighteen feet bosh) made during the week ending August 8th, a very large run of 612 1410-2240 tons pig iron. This, so far as we know, has never been excelled, nor indeed equaled, by any furnace of the same size. In order to give an adequate idea of the enormous amount of iron this furnace makes, we will give the product of the last four weeks:

	Tons.	Lbs.
Week ending July 18th	555	1,150
" July 25th	556	240
" Aug. 1st	587	1,530
" Aug. 8th	612	1,410
Total	2,311	2,090
No. 1 Foundry Iron	624 960	
No. 1 Gray Mill Iron	1,687 1,130	2,311 2,090
Average per week	578	
Largest run in one day	102	630

No. 2 Furnace (twenty feet bosh) has just been relined, and will turn out about, when running, 700 tons weekly, making the total product of this company's two furnaces 1325 tons per week, or about 65,000 tons annually.

Favorable Mention.—Among our "special notices" this week will be found an advertisement signed "Iron." The advertiser, who seeks an engagement as salesman in the iron or metal trades, is a gentleman of wide business connection and long experience in iron and metals, and wou'd be found a valuable man in any branch of the business. We invite attention to the advertisement.

Bids for supplying the city of St. Louis with water pipes were opened last week; also for the construction of a fountain at the water works. The first portion of the bid called for 870 tons of twenty inch pipe, 450 tons of fifteen inch pipe, and 140 tons of twelve inch pipe. The following were the bids.

Shickle, Harrison & Co.,	$57·79 per ton of 2240 pounds.
Dennis Long, of Louisville	$60·40
Allis & Co., of Milwaukee	59·10
Ambrose & Smith, Columbus, Ohio	61·00
Gaylord Iron and Pipe Co., Cincinnati	59·50

Messrs. Shickle, Harrison & Co. made the lowest bid, and consequently were awarded the contract, together with the contract for the erection of the fountain.

London Metal Market.

(*From The Mining Journal.*)

	£.	s.	d.	£.	s.	d.
Copper—₰ ton.						
Best Selected	85	0	0	87	0	0
Tough Cake & Tile	83	0	0	83	0	0
Sheathing and Sheets	90	0	0	92	0	0
Bolts	96	0	0	98	0	0
Bottoms	93	0	0	95	0	0
Old	80	0	0	85	0	0
Australian	86	0	0	88	10	0
Wire ₰ lb.	0	1	0¾		—	
Tubes "	0	1	0¾	0	1	1
Brass—₰ lb.						
Sheets	0	0	10	0	0	11
Wire	0	0	10¾	0	0	11
Tubes	0	0	11	0	0	12
Yellow Metal Sheathing	0	0	7⅝	0	0	8¼
Sheets	0	0	8		—	
Spelter—₰ ton.						
Foreign on the spot	22	10	0		—	
" to arrive	22	5	6		—	
Zinc—₰ ton.						
In Sheets	28	10	0	38	15	
Quicksilver—₰ bottle.	21	0	0		—	
Tin—₰ ton.						
English Blocks	97	0	0	98	0	0
Ditto Bars (in bris.)	98	0	0	99	0	0
Ditto Refined	100	0	0	0	0	0
Banca	98	0	0	100	0	0
Straits	95	0	0	0	0	0
Australian	96	10	0	0	0	0
Tin Plates—₰ box.						
IC Charcoal 1 qual.	1	16	0		nom.	
IX " 1 qual.	2	0	0		"	
IC " 2 qual.	1	15	0		"	
IX " 2 qual.	2	1	6		"	
IC Coke	1	8	0	1	10	0
IX "	1	14	0	1	16	0
Canada Plates ₰ ton.	19	0	0		—	
" at works	18	10	0		—	
Iron—₰ ton.						
Bars Welsh, in London	9	10		9	15	
" to arrive	9	5	0	9	10	0
Nail Rods	11	0	0		—	
Nail Rods, Staff'd in L'don	11	0	0	0		0
Bars	11		0	14	0	0
Hoops	12	0	0	13	0	0
Bars at Works	10	0	0	11	0	0
Hoops ditto	11	0	0	11	0	0
Sheets, single, and plates	13	0	0	15	0	0
Pig, No. 1, in Wales	5	0	0		10	0
Refined metal ditto	7	0	0	8	0	0
Bars, common ditto	8	10	0	0		0
Do, merchant, Tyne or Tees	9	0	0		—	
Ditto, Railway, in Wales	7	10	0	8	0	0
Ditto, Swedish, in London	16	0	0	17	—	
To arrive	16	0	0	17		
Pig, No. 1, in Clyde	3	0	15	4	5	
Ditto, f.o.b., Tyne or Tees	4	0	0	5		0
Ditto, Nos. 3, 4, f.o.b.					—	
Railway Chairs	5	0	0	5	5	0
" Spikes	12	10	0	14	0	0
Indian Ch'coal Pigs in L'don	10	0	0	12	0	0
Steel—₰ ton.						
Swedish, in kegs (rolled)						
Ditto (hammered)	19	10	0			0
Ditto, in faggots	21	0	0		—	
English, spring	23	0	0	25	0	0
Lead—₰ ton.						
English Pig, common	21	0	0	21	5	0
Ditto, LB	21	5	0		nom.	
Ditto, WB	21	15	0	22	0	0
Ditto, Sheet	22	10	0		—	
Ditto, Red Lead	23	0	0		—	
Ditto, White	30	0	0	35	0	0
Ditto, Patent Shot	25	0	0	28	10	0
Spanish	21	0	0	21	2	6

* At the works 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below the plates of similar brand.
† Add 6s. for each X.

SILICON IRON AND STEEL.

*Its Manufacture, Properties and Qualities.**

BY CALVIN PEPPER.

Gentlemen of the Institute: In giving the following description of the principles and the application of my processes for the manufacture of silicated iron, silicon iron and silicon steel, it is in expectation that I may be required to repeat, by actual trials and demonstrations, under the immediate direction and supervision of a committee of the Institute, proofs of the manufacture, properties and qualities of the metal as herein claimed by me. This paper is read at this time as preliminary, and to accompany the decisive scrutiny and investigation of the Institute, in regard to which I promise strict conformity and compliance with the requirements of the Institute.

It is my purpose to make entry of the metal, with full and complete exhibits for competition, at the public fair of the Institute, to be held at Philadelphia, commencing October 6th, of the present year, and before the fair opens to have introduced into Philadelphia, as the first field, the manufacture and sale of the metal upon a large scale.

GENERAL PRELIMINARY STATEMENT.

I claim to be the first and original discoverer and inventor of the process of making the silicated iron, silicon iron and silicon steel from wrought or malleable iron without change of form; from cast or carbon iron without change of form; and direct from the ore by a continuous process with or without fusion. The only materials or agents used for the manufacture of the metal are the iron or ore to be converted, common silicious sand, an air blast and fuel. The conversion of all the metal may be made, according to variations of requirements, in close or confined vessels or receptacles, or in open fires, with free circulation of the air and gases of combustion; in smelting, blast or reverberatory furnaces, as at present constructed; in common forge fires as in general use; or the converting preparations may be improvised with piles or heaps of the ore, metal, sand and coal, as outside of or separate from any building or structure. The metal to be converted may be from all qualities of merchantable ores and iron, the impurities being eliminated or neutralized. The silicon steel consists of silicon as the governing alloy in respect to all the properties of iron and steel, and possesses all the properties of the best iron and the best steel in combination, never before known of any other metal. The silicated steel, as distinguished from pure silicon steel, possesses all the properties of the iron greatly improved, but contains in addition to the silicon, as the governing alloy, some carbon that gives carbon steel properties as added to and improved by silicon steel properties. The silicated malleable iron can only be mild tempered. The silicated cast or carbon iron contains more carbon, or less silicon with carbon, than silicon or silicated steel with carbon, and is greatly improved iron, but possesses no steel properties. The metal or ore to be converted is to be immersed in separated pieces or small piles in the silicious sand as a menstruum or heating medium, and to silicate the metal. The greatly increased sand heat at high temperature, as added to that of the fuel, is essential to produce the allotropic effects of the heat required for silication. I claim that the silicon steel is made quicker, better and cheaper than any other steel.

SAND AS A HEATING MEDIUM.

Without heat there could be no metallurgy, but metallurgic operations at ordinary temperature seem to have been the limit in practice, and, indeed, without a heating medium, as silicious sand, this limit cannot be exceeded. The sand medium possesses constitutional heating properties for the excitation and potential manifestation of the dynamic heat force that leaves nothing to be desired. It is, indeed, if without a flux (as, for instance, soda, borax or lime), absolutely infusible at any heat; and any metal immersed in sand that has no metal flux, as, for instance, carbon takes on the condition of the sand and becomes alike infusible with it at any heat, and, hence, a much higher temperature may be given to the metal than would serve to fuse it without the sand protection. The sand is not only a reservoir of heat (and as such it is the best that could be used), but also from the heat stimuli, or sand heat, as applied from the fuel, it gives forth greatly increased heat. The sand also from its covering prevents waste, or too rapid consumption of the fuel without decrease, but with absolute increase, of the temperature. It not only husbands the heat, but gives it more potential energy. Heat, as now applied for metallurgical purposes, is enormously wasted. It is estimated that for every ton of coal used, only 133 lbs. are made effective. The heat is mostly carried off by the gases, the weight of which discharged from a blast furnace more than equals the amount of air and gas consumed. The sand arrests and absorbs the otherwise escaping heat, and is itself a reproductive agent to give it forth again to the metal.

If the sand imparted no more heat than it receives direct from the coal, according to the old school of chemistry, I do not believe I could make silicon iron or steel. The sand can be made to give forth a heat that cannot be equalled by the direct heat of any fuel on the surface of any heated metal. After a certain temperature is attained, the sand gives forth heat to all surrounding bodies; but until such temperature is reached, it is very exacting in absorbing heat from all surrounding bodies. Each separate minute grain of quartz sand is a crystallized six-sided prism, terminated with six-sided pyramids, and hence, in mass, gives innumerable planes and angles and interstices for the radiation, reflection and transmission of heat, and such permeability and minute division of air and gases at insensible distances as to give chemical affinity and atomic and molecular changes and effects not otherwise attainable. There can be no explosion of gases in sand. It requires a much less application of heat to raise a given weight of sand to a given temperature, so as to effect the thermometer and third bodies alike, than is required by most other bodies. This, according to the theory of latent heat, is called the difference of specific caloric, or capacity for caloric, and varies greatly in bodies. It cheapens sand heat. The absorbent power of sand for applied heat exceeds that of any metal, or most substances, and this property not only cheapens the accumulation of heat in the metal, but prevents the burning or fusion of all bodies in contact with it, according to the closeness of contact. If the sand was not comparatively a slow conductor of heat, there would not be equal retention or accumulation to give radiating temperature, but this temperature attained, it radiates with more power, for radiation is in direct proportion to the absorption, and not the conduction, of heat. Sand being infusible by heat without a flux, and possessing this property in common with pure iron without any alloy, in or out of sand, such is its molecular or constitutional action that its applied heat or equivalent heat force generates heat reproductively, or with increase. As a heating medium, silicious sand is absolutely unequalled by any other for any use.

Many years ago I obtained Letters Patent of the United States, for heating by radiation from an extended sand surface, whatever the fuel used; and also separate Letters Patent for burning gas upon a sand surface for heating and illuminating purposes. I have also obtained Letters Patent for covering the entire surface of fire with minutely divided streams of air to aid combustion. I have demonstrated that steam may be generated in a steam boiler containing sand confined by a fine wire gauze screen, quicker and at less cost than without the sand; and that its use prevents saline and carbonate of lime incrustations in the boiler, and is a protection to the iron against burning from the furnace fire without water in the boiler.

Sand, generally impure or mixed, is now used in connection with lime in the stack or cupola of the smelting furnace in the reduction of iron, as a flux only, the fused or vitrified sand, from the action of the lime, and the lime in the flux state, together with intermixed waste iron entering into the composition of the *slag*. I believe that sand is in no proper sense a flux of itself; but that soda, borax and lime are fluxes of the sand as regards vitrification. The ore may be reduced in the furnace as immersed in separate small heaps or parcels in pure sand, the carbonic oxide of the fuel uniting with the oxygen of the iron, and passing off in gaseous form as carbonic acid. The sand as a menstruum will give the requsite temperature; the sand, as heretofore used, will not give it. The process may be continued to produce silicated iron or silicon steel, as explained hereafter.

Without the intense heat of the burning silicon in the Bessemer furnace, the fluid mass of metal could not be kept in a fluid state a sufficient length of time to effect the conversion in the converter.

SILICIOUS SAND AS USED FOR SILICATION.

Silex, silica, oxide of silicon, silicic acid, are different names for the same substance. It is the most abundant and extensively diffused mineral, and as existing under the different names of quartz, opal flint, chalcedony, &c., and comminuted quartz and silicious sand, may be found everywhere. Comminuted quartz, as the white sand of the sea shore, is one of its most common conditions. Silicon is the oxide of silica deoxidized. Silicon or silicium is never found in a native state. Combinations of silica with bases are termed silicates; and of silicon with bases, silicides. I have found that the sand deoxidized so as to silicide the iron, as in contact only with the iron or contiguous thereto. I have found after silication amorphous silicon in the sand as slightly adherent to the iron; porous, friable, floculent, beautifully white; also of a brown color as produced in the laboratory; also of a darker color as graphoide silicon, but containing no carbon. The graphoidal silicon, when mechanically contained only in the metal, sometimes crops out in black streaks or spots, but they disappear before the file, or on forging, and are not flaws. All these states of free silicon in the sand may be brought again to the oxide state, purer than before. The amount of sand deoxidized is very small compared with its mass or bulk, and which remains intact and unimpaired for future use. If the sand has not been freed of its lime, as contained in sea shells, local vitrifications of it will take place; but to such a small extent as to be of little account, and I have never seen it productive of injury to the metal. When silica or silicon combines with the impurities in the sand they form a friable crust upon the surface; but this differs from slag of the smelting or reverberatory furnace in being friable, produced without fusion, and as containing no waste iron. The silica and silicon combines mechanically with the metal as does carbon—as graphite in gray iron—or chemically as an alloy—as does carbon in white iron—with different effects, to be mentioned hereafter. The great mistake of most metallurgists for ages has been that the action of silicon in iron or steel is always of itself an injury to the metal, and it has even been said to be more so than the presence of sulphur or phosphorus; and that all alike are banes to be got rid of as much as possible. It has been said that ·03 of one per cent. of silicon will give rottenness to the metal. Now, as a conclusive answer to this, I have taken Bessemer iron, furnished me by the Bessemer Steel Works, at Troy, as decarbonized, freed as much as could be of all silicon or other foreign substances by the Bessemer process, as shown by the spectroscope; removed from the furnace and suffered to cool, without the addition of spiegeleisen or franklinite, or other carbonizing material; and so near pure iron as to be almost infusible of itself; for, as before said, absolutely pure iron, in or out of sand, and pure silicious sand are alike infusible at any heat. This metal as delivered to me was in no respects malleable or forgeable, and apparently not admitting of any change—of no mercantile value whatever. By silicating this otherwise worthless mass, it became perfectly malleable and forgable, and could be fused, worked or wrought into any shape. Silicon, like carbon, has hardening properties of itself. It is constitutionally harder than carbon, as Fe,Si,O_3 is to Fe,C,O_2, as glass is harder than ice. Emery, flint and quartz crystal show the very great hardness that may be imparted to silex. But silicon, unlike carbon, imparts also malleable properties to hard iron, as I have shown. Wrought iron, as decarbonized and refined, but yet as containing some alloy, is malleable from its absence of carbon. Karston gives the maximum at which iron will combine with carbon at 5·93 per cent. of the latter. With ·2 or ·25 per cent. carbon the iron becomes steelish; ·35 per cent. of carbon makes the iron steel; ·5 per cent. will make steel that will strike fire. Malleability of the metal ceases at 1·75, and at 1·8 may be worked with difficulty, and at 1·9 ceases to be malleable while hot, and 2 per cent. is the limit between steel and cast iron, and it cannot be then drawn or worked. With carbon, a combustible so readily affected by heat, and requiring such nice quantitative adjustments and proportions, how is it possible there can be reasonable certainty of results of physical properties in the manufacture of carbon iron or steel? There must be a substitute or antidote, or both, for the uncertainties of mere carbon effects in iron or steel manufacture; and this found, both iron and steel properties will be retained, increased and improved. Silicated iron and steel will alone answer the conditions as in different degrees of perfection to the perfect metal; and in no stage will the silicon give deterioration or injury to the metal in any of its pre-existing properties or qualities. There cannot be an *excess* of silication except as regards giving high tool hardness by dipping in water, and this applies equally to carbon steel.

Notwithstanding the almost universal prejudice that has always existed against the employment of silica or silicon in the manufacture of iron or steel, there has not been wanting in the ordinary processes of metallurgy evidences that these prejudices are founded upon assumptions almost entirely.

Simply annealing iron in sand has often improved its qualities, and the practice is not uncommon.

Percy has produced a metallic button, reduced in charcoal and sand, containing 13·87 per cent. of silicon. Berzelius detected in a certain kind of bar iron 18 per cent. of silex, and the iron was still malleable and useful. Overman and Osborn, in their respective, and latest, works on metallurgy, both concede that silica may be combined with iron to the amount of even ten per cent., with improvement to the iron as iron. Parry says that pig iron containing 3 per cent. silicon has a smooth face, and from 1 to 2 per cent. a honey-combed face. I have found in silicating ore and pig iron that the specular and granular appearance disappears, and the ore and pig becomes smooth and conchoidal in proportion to the silication. In the pig, as the decarbonization and silication progresses, the characteristics of silicon crystallization will appear. Carbon may be extracted as well as introduced by the cementation process of making carbon blistered steel. Spiegeleisen contains of iron 88·961; carbon, 5·440; silicon, 1·19; manganese, 4·03 per cent. Percy says that when spiegeleisen at a high temperature is acted upon by silica, the manganese is converted into a protoxide, which combines with the silicon to form slag; and most of the carbon is separated in the form of graphite, which is replaced by silicon.

It is a very strong and suggestive fact that the ores of the celebrated Indian or Wootz steel, coming nearest to the Damascus steel of old, contains about 42 per cent. of silex. What wonder, then, that the ores of the Nes steel, so called, and of the Codorus steel, so called, containing such large percentage of silex, should, as now recently used for steel making purposes, improve the qualities of the metal; though from the imperfections of the process of manufacture, and the limited application of the silex, all the steel properties claimed are derived from carbon?

To come down to the present time, Professor Riley, of the School of Mines, London, is the farthest advanced of any acknowledged savant in the manufacture of silicon metal. And now comes the very recent announcement that a patent has been issued in Belgium for combinations of iron and silicon up to 25 per cent. of silicon. All the manufacture of silicon steel, so called, of which I have any knowledge, has been made since I first made the metal, as hereafter described, in close crucibles, at the crucible steel works of Thompson & Co., Jersey City, and a few days later at the Globe Works, New York, in the spring of 1867. I never knew or heard of the metal, as I manufacture it, being made in an open forge fire or reverberatory furnace, as hereafter described and made by me at Courrier's Iron Works, Newark, New Jersey; Herring's Safe Works, New York; the Bethlehem Iron Works, Pa.; Boughton's Union Iron Works, Chicago; the last exhibition fair of the American Institute, and at other places. I know of no attempt to make the steel direct from pig or cast iron, or direct from the ore, except as made by me and hereafter described. I was the first to convert a section of old iron rail, without change of form, into pure silicon steel throughout the entire substance, and the first to convert metal, make a fagot, run it through the mill and make an entire silicon steel rail. I proved the superior tensile strength and other physical properties of the silicon steel on the hydraulic testing machine, said to be the best of its kind, at the works of the American Bridge Company, Chicago. The perfection of the silicon steel, by giving extra hardening properties throughout, has not yet been shown in public, but I have accomplished it, as will be hereafter described.

DISCLAIMERS.

1. I make no claim for the use of sand for any merely annealing purposes whatever. The conversion of the metal into silicated iron or steel, as herein set forth, is not an annealing process; indeed, it does not partake of the characteristics of annealing at all, except in some degree incidentally, without affecting in the least the characteristic principles and their application of the invention. The principal if not sole purpose of annealing is to give a heating to cool slowly, that the particles may aggregate more equally and uniformly throughout, and for this purpose, when sand has been used, it has been only as a covering, supposed to be inert except as a covering and reservoir of heat, and for which other substances may be substituted and are more frequently used. Cast iron has often been annealed in sand, to give it more or less malleability as the effect of slow cooling. The object and result of such annealing is exactly the reverse of the silicon process. The annealing was never undertaken for the purpose of producing steel, or to give a crystalline metal, but to give somewhat malleable properties to cast iron, and as a consequence its granular or fibrous texture, or, in other words, to restore iron to its fibrous state, and of course without the allotropic effects of the high temperature necessary in the silicon process to make fibrous iron crystalline, for without crystalization there can be no pure silicated iron or silicon steel. Again crystalized wrought iron has been annealed in sand to restore its fibrous character, malleability and other properties, as wrought iron deteriorated by constantly recurring concussions or vibrations, as for instance, from trains of cars passing over iron rails, or from fusion or other causes that make the fibrous iron crystalline or granular iron. Here again the object and effect of such annealing is the reverse of the process for making silicon steel. Mere iron crystals, showing as they do deterioration of iron, and silicated iron crystals, though to all mere casual observers alike, are entirely different in causes, character and properties. 2. I make no claim for the use of any magnetic or silicon ore as heretofore patented as such, by any person for making what has been termed heretofore silicon steel. I only claim to use silex in the condition of silicious sand, with no greater purity as silex than ordinary white sand of the sea shore. 3. I do not claim and do not believe that silicated iron or steel can be made from combined silex only as contained in any ore, though silicon iron ores, like other merchantable ores, may be utilized in the manufacture of the iron and steel if the ore contain not less than sixteen per cent. of merchantable iron, 4. I do not claim and do not believe that pure silicated iron or silicon steel can be made by any puddling process, or by per cent. additions of the silex to any extent in such furnaces. No mere puddling or reverberatory furnace will give the required heat and silication without the sand as a menstruum in which the metal or ore, piece by piece, or in small separate piles or heaps, must each be surrounded or buried. 5. I do not claim or use the application of carbon, chromium, aluminum, borax, manganese, tungsten, nitrate of soda or potash, iodide of potassium, magnetic silicon ore, electricity, or any other foreign ingredient or agency as heretofore patented or applied for any metallurgic purpose whatever. 6. I disclaim the use of any of the ores from which the so-called Nes silicon steel, and the so-called Codorus steel, have heretofore been made.

CHARACTERISTIC THERMAL EFFECTS IN THE MANUFACTURE AND PROPERTIES OF THE SILICATED IRON AND SILICON STEEL.

The metal may be appropriately called "The Thermal Metal," for it is made by a degree and process of application of allotropic heat, as never before applied for any metallurgical purpose whatever. The thermal allotropic effects of sand heat are essential to the processes.

The effects of greatly increased heat, merely as heat, in producing allotropic changes of substances as of essentially different properties and qualities, but still consisting of the same constituents and in the same proportions, though probably of different groupings of the molecules of matter, are well understood. Thus carbon exists from the differences of heat alone in the diverse conditions of charcoal, graphite or black lead, and the crystallized diamond. Sulphur may be made to loose all its properties of limestone sulphur, as combustibility, &c., and take on entirely new properties from differences of heat alone.

We cannot get the allotropic effects of heat to metal to be converted and necessary to produce the changes at any sand or metal heat at which the sand or metal could be fluxed or melted, at a temperature the highest that can be reached for vitrifying sand or for fusing metal in any ordinary metallurgic processes or operations. The sand used in the smelting furnace is fluxed by the lime, and enters into the slag before it can have attained a temperature necessary for the allotropic effects to produce silication, and hence it never gives silication to the metal, and such too will always be the case, if the iron from any cause take on the repulsive or separating action of the molecules as the effect of heat before the silicon as a portion of the metal has become chemically, or as an alloy, incorporated with it. There can be no silication by throwing sand in the Bessemer converter to silicate, as spiegeleisen is thrown in to carbonize the metal. The effects of puddling sand in the puddling furnace can only be limited and partial, and will combine mostly mechanically as an oxide or silex, and not chemically as silicon in alloy with the metal. Carbon, as a combustible burns out of metal as accidentally united with it, and as its combination so are its effects transient as compared with silicon.

The allotropic effects of the sand heat and silication must show themselves in radical changes of the iron, and this we find to be the case in most important characteristic particulars, in regard to which at this place allusion only is made, to be spoken of in detail hereafter. The new metal shows unmistakably external appearance of change, such as any heating without the sand could not produce. Its internal structure throughout its entire substance is changed from fibrous to crystalline; but the crystals differing from heat effect without the sand as capable of being drawn out equal to the fibres of the best wrought iron. It is constitutionally harder throughout, and tougher than before. Its tensile strength to resist strain, twisting and torsion, and also its resilience or power to resist shocks or blows, are greatly increased. It does not become harder by being made more brittle at the expense of toughness, like carbon steel. Its ductility and elasticity are also increased. It will endure a higher temperature without fusion or burning than other iron or steel. It will forge or weld readily on to itself, iron, or other steel, at a white, its normal heat, when other steel at such heat would fuse or burn. It will harden superficially in water, so that no file will touch it, with any amount of silication that can be given. While with less silication, with some modification of process, or with any silication with carbon, it will harden equally throughout the entire substance. It gives, under all conditions, self-welding properties without a flux. It becomes in fact a new metal.

I have often converted wrought iron into the steel without change of form, exposed to a heat of four hours' duration as immersed in sand or crucibles, placed in the same pit in which crucible carbon steel was being made at the same time. When taken out of the fire, pot, sand and metal would be alike at an intense white heat. When carbon iron was exposed to the same heating, in the same way, it would melt in the sand, for the vessels being close, there was no air circulation to decarbonize the iron, the carbon of which then acted as a flux to the metal. With free circulation of the air and gases of combustion, carbon iron and wrought iron are alike infusible in the sand, whatever the temperature. I have converted wrought iron without change of form into silicon steel, in open fires, and as exposed at different times to an air blast of from one up to ten hours' duration, with free circulation of the air passing through the fuel and sand, with the metal exposed to the action of the circulation. The gases of combustion will not carbonize the iron; it cannot carbonize without actual contact with solid carbon, with air circulation cut off or suspended. With free circulation of the air there will be no carbonization, but there will be decarbonization; the oxygen of the air uniting with the carbon of the metal and passing off as carbonic acid. With free circulation, too, sulphur and phosphorus are eliminated from the metal, and pass off wholly or in part in gaseous form as phosphorus and sulphuric acid. With free circulation, too, phosphorus, sulphur and other impurities are not taken up by the iron from the coal in combustion containing such impurities. Silica or silicon can not be made gaseous, and hence will silicate or silicide the metal with or without free circulation of the air. It is a most important fact that the oxygen of the air, in its circulation, will not oxidize the metal while undergoing the process of silication. It follows from what has been said that decarbonization and silication may be contemporaneous, without fusing or burning or oxidation of the metal.

At a heating on a forge fire at Boughton's Union Iron Works, Chicago, pieces of wrought iron of all sizes and qualities, also cast and pig iron and iron ore, were placed in the same forge fire at the same time, and taken out at the same time. The blast was kept up for seven hours, and at 6 p. m. taken off. The next morning at 10 o'clock there was still fire from top to bottom, center to circumference, of the improvised furnace, and much of the metal and ore was taken out at a red heat, without change of form, and without the least fusion, burning or warping of the metal. The sand, metal and ore were all known to be at a white heat from an early stage of the heating. Again, I have silicated wrought iron, apparently perfectly, with an application of only one hour's heat. It requires a much less time to silicate wrought iron than to both decarbonize and silicate at the same time cast or pig iron. For all the purposes of iron and mild steel there cannot be deterioration of the metal from excessive heating or silication.

176 Fulton street, N. Y.

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* A paper read by Mr. Pepper before the Franklin Institute, at a regular meeting of the Institute, May 20th, 1874.

The Cope & Maxwell Manufacturing Co., of Hamilton, who have established a branch in Chicago, have recently made a contract with the town of Clinton, Iowa, to furnish one set of machinery for their water works, with compound engines, the cylinders of which are convertible from condensing to non-condensing. They are making another set of pumps, to be driven by duplex engines. This company are making special efforts in the manufacture of water working machinery, have taken several contracts, and have others in abeyance. A large pumping engine has been recently sent to London, Eng., for use in mines, the attractive point being the valve, whose cushioning feature prevents, with certainty, the overrunning of any of the moving parts of the machine, and permits an entire stroke, without loss or excess of clearance, for the main piston.

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BARBER RATCHET BRACE.

This Brace has a Lignum-vitæ Head, Rosedale, Wrought Iron Sweep, Malleable Iron Nut & Socket, with

Cast Steel Jaws, Pawls and Rachet Wheel,

It is beautifully finished, and in all respects the

MOST PERFECT BRACE IN MARKET.

In places where there is not room to revolve the sweep, a slight back and forth motion will drive the bit in or out. They cost only 50 cents more than the same style of brace without the Ratchet attachment, and will surely come into general use.

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WITH THIS

BRACKET SAW

An infinite number of useful and ornamental articles can be made. It will pay for itself every day when in use. The frame is 5x12 in., and made of red cherry wood, beautifully polished.

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In addition to the 20 Cast Steel Tools inclosed in this handle, it will hold anything from an 8 inch Mill File to a Cambric Needle. It is by far the best Tool Holder in use, and will also answer nearly all the purposes of a Hand Vise. The wood is lignumvitæ and hard maple, the ferrule, malleable iron, and the jaws cast steel. Most hardware dealers keep them, or will send to us for them.

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This is the most powerful Cutter in use, and just what is needed by all retail iron dealers. Also by shipbuilders, manufacturers, and all others having iron to cut. It will cut iron twice as large as any other machine of the same cost.

	Weight.	Cuts.		Price.
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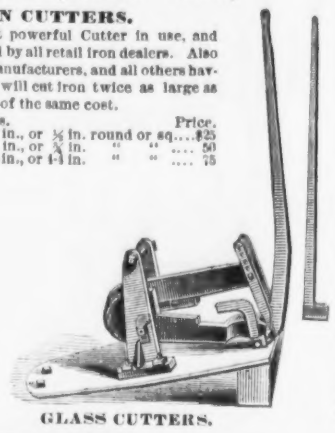

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The New Double Screw Parallel "Leg" Vise.

We are now ready to furnish, as the result of more than thirty years' experience, our latest style of Vise—the best yet made. It is **Stronger** than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping, instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type, and which depending upon slides alone for preserving parallelism, can never be screwed up very hard without "jamming" on the slides or breaking.

Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it; is always perfectly parallel at all points of opening, and never gets out of line. Embodying the same general principle as the well known Chain Vise, so long made by us, we have by new, scientific proportioning of all the parts, and with our recently improved metals for their manufacture, obtained so perfect a tool, that we now *warrant* these Vises for *three years*, from date of manufacture stamped upon each.

The Jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in *solid cut thread* boxes.

The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it.

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" 4,	" 6½ in. x 1¾ in.	" 1¾ in.	"	" 19 in.	"	" 7⅞ in			22 00
" 5,	" 7 in. x 1¾ in.	" 1¾ in.	"	" 24 in.	"	" 9 in			30 00
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All sizes of these Vises furnished with Swivel Attachment, at an additional cost of $1 to $3.

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American Meat & Vegetable Chopper.

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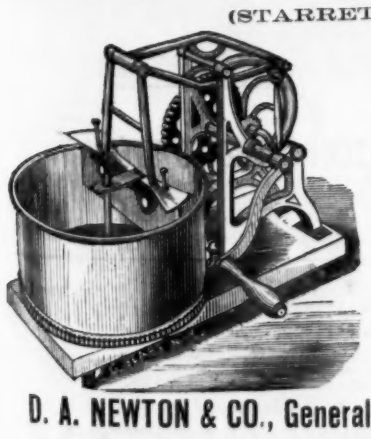

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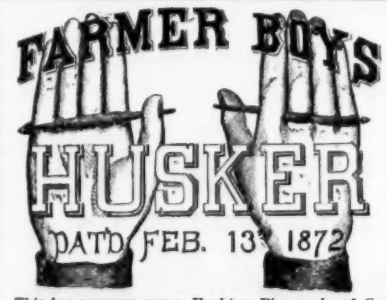

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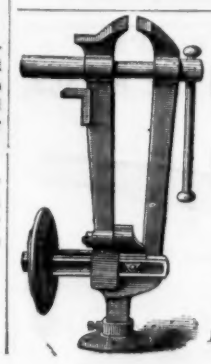

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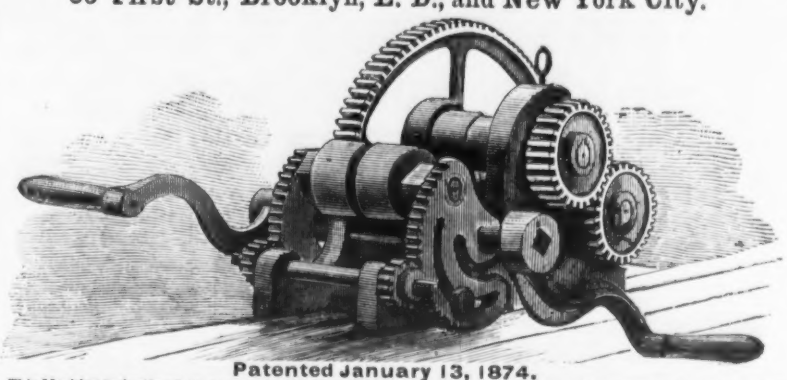

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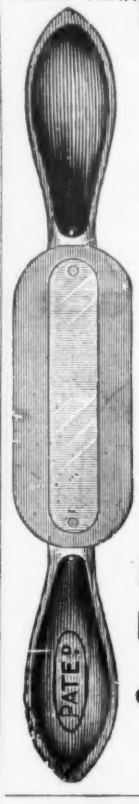

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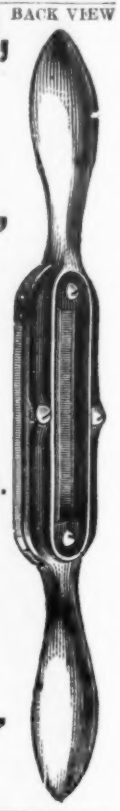

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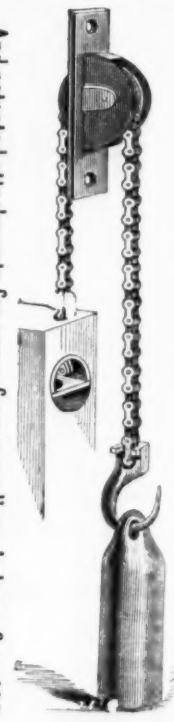

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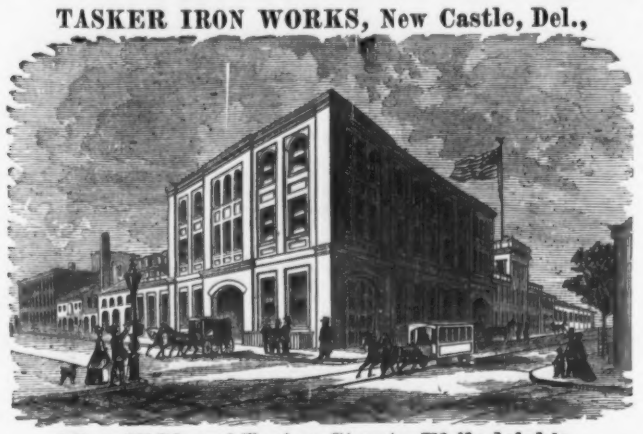

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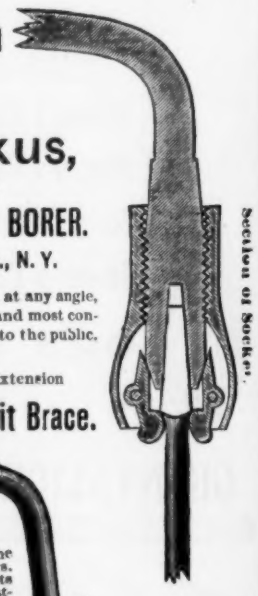

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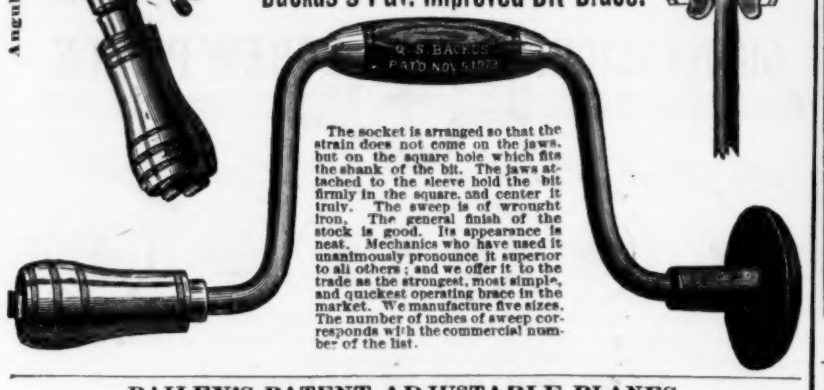

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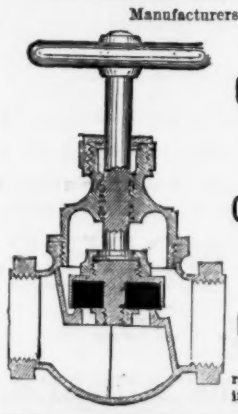

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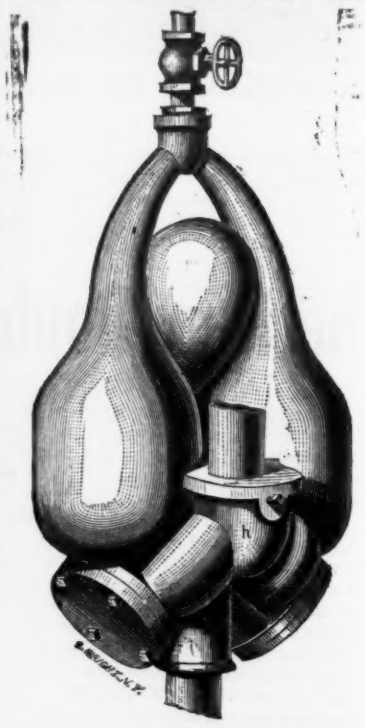

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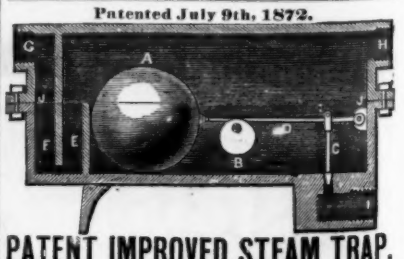

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Pugsley & Chapman, 6 Gold, N. Y. 36
Shepard Sidney & Co., Buffalo, N. Y. 27
Wiley & Russell, Greenfield, Mass 21

Helve Hammers, *Makers of.*
Bradley Mfg. Co., Syracuse, N. Y. 34

Hoisting Engines. *Makers of.*
Howard Geo. C., 17 S. 18th, Philadelphia. 36
Otis Bros. & Co., 348 Broadway, N. Y. 9
Todd & Rafferty Machine Co. 10 Barclay, N. Y. 34

Horse Hay Forks and Fixtures, *Makers of.*
Nellis A. J. & Co., Pittsburgh, Pa. 36

Horse Nails, *Makers of.*
Ausable Horse Nail Co., 35 Chambers, N. Y. 31
Brundage & Co., Middletown, N. Y. 10
Globe Nail Co., Boston, Mass. 31
Pratt & Co., Buffalo, N. Y. 27
Putnam S. S. & Co., Neponset, Mass. 2

Horse Shoes, *Makers of.*
Burden Iron Works, Troy, N. Y. 4

House Furnishing Goods.
Tifft & Howard, 12 Murray, N. Y. 30

Hydraulic Jacks.
Dudgeon Richard, 24 Columbia, N. Y. 34

Insurance, Boiler.
Hartford Steam Boiler and Inspection Co. 33

Iron Brokers.
Boynton Geo. A., 70 Wall, N. Y. 6
Crane U. O., 104 John, N. Y. 2
Hazard & Jones, 204 Pearl, N. Y. 4
Read & Dickey, Cleveland, O. 36

Iron, Corrugated, *Manufacturers of.*
Corrugated Metal Co., East Berlin, Conn. 4
Mosely Iron Bridge and Roof Co., 5 Dey, N. Y. 4

Iron, Charcoal, *Warm or Cold Blast.*
Quincy John W., 98 William, N. Y. 4

Iron Commission Merchants.
Althouse & Umberger, 341 Walnut, Philadelphia. 5
Blakiston & Cox, 333 Walnut, Phila. 5
Hand Jas. C. & Co., 614 and 616 Market, Phila. 29
Hoopes W. Graham, 419 Walnut, Phila. 5
Malin Bros., 228 Dock, Phila. 5

Iron, Pig, *Importers of.*
Williamson James & Co., 69 Wall, N. Y. 4

Iron Dealers.
Abeel Brothers, 190 South, N. Y. 4
Bonnell, Botsford & Co., Youngstown, O. 4
Borden & Lovell, 70 and 71 West, N. Y. 4
Cleveland, Brown & Co., Cleveland, O. 6
Coddington T. B. & Co., 25 Cliff, N. Y. 4
Conklin & Huerstel, 99 Market Slip, N. Y. 4
Fuller, Lord & Co., 189 Greenwich, N. Y. 4
Fuller, Dana & Fitz, 110 North, Boston 2
Gardner Wm., 573 Grand, N. Y. 4
Harrison & Gilloon, 556 to 562 Water, N. Y. 4
Hart G. A., 208 Walnut, Phila. 4
Holden, Hopkins & Stokes, 104 John, N. Y. 5
Jackson & Chase, 206 and 208 Franklin, N. Y. 4
Judson B. F., 457 and 459 Water, N. Y. 4
Matthews Chas. W., 123 Walnut Phila. 5
Mohr J. J., Philadelphia 5
Packard, Goff & Co., Youngstown, O. 4
Pettee & Mann, 228 and 229 South, N. Y. 4
Pfefferle John F., 531 Water, N. Y. 4
Pierson & Co., 24 Broadway, N. Y. 4
Quincy John W., 98 William, N. Y. 4
Richards D. W. & Co., 92 Mangin St., N. Y. 4
Smith Gam'l G. & Co., 342 Pearl, N. Y. 4
Warner A. B. & Sons, 28 and 29 West, N. Y. 4
Williamson James & Co., 69 Wall, N. Y. 4
Whitney Alfred R., 58 Hudson N. Y. 4

Iron, *Manufacturers of.*
Britannia Iron Works, Middlesbro', Eng. 6
Burden Iron Works, Troy, N. Y. 4
Cleveland Rolling Mill Co., Cleveland, O. 6
Coffin Wm. E. & Co., 8 Oliver, Boston 4
Boston Rolling Mills, 17 Battery march, Boston 4
Everson, Graff & Macrum, Pittsburgh, Pa. 4
Fulton S. & Co., 242 S. Third, Phila. 5
Girard Rolling Mill Co., Girard, O. 4
Leonard John, 450 & 451 West st., N. Y. 4
Milwaukee Iron Co., Milwaukee, Wis. 6
New Haven Rolling Mill Co., New Haven, Ct. 6
Old Dominion Iron & Nail Works Co., Richmond, Va. 6
Oxford Iron Co., 81 Washington, N. Y. 4
Phœnix Iron Co., 410 Walnut, Phila. 5
Rowland Wm. & Harvey, Phila. 36

Iron, Swedish, *Importers of.*
Jessop Wm. & Sons, 91 and 93 John, N. Y. 32
Mitander Nils, 69 William, N. Y. 4

Lace Leather, *Manufacturers of.*
Stoyle Wm. H., 403 Library, Phila. 10

Lanterns, *Manufacturers of.*
Dietz R. E., (Tubular) 54 and 56 Fulton, N. Y. 36
Howard & Morse, 45 Fulton, N. Y. 2

Lead Kettles.
Phillips Thos. & Co., Providence, R. I. 10

Locks, *Manufacturers of.*
Bohannan Wilson, Broadway and Kossuth, Brooklyn, E. D. 2
Branford Lock Works, Branford, Conn. 12
Norwich Lock Co., Norwich, Conn. 10
Romer & Co., Newark, N. J. 22
Trenton Lock Co., 48 Warren, N. Y. 21
Yale Lock Mfg. Co., 298 Broadway, N. Y. 32

Machinery, *Makers of.*
Bement Wm. B. & Son, Philadelphia 35
Chapin Machine Co., New Hartford, Conn. 35
Goodspeed & Wyman, Winchendon, Mass. 34
Place George & Co., 121 Chambers, N. Y. 31
Pratt & Whitney Co., Hartford, Conn. 34
Sellers Wm. & Co., 1600 Hamilton, Phila. 35
Watson Andrew, 537 Dickinson, Phila. 35
Wetherill Robert & Co., Chester, Pa. 34
Wood Thomas, 2106 Wood, Phila. 35

Machine Screws, *Makers of.*
American Screw Co., Providence, R. I. 13
Lyon & Fellows Mfg. Co., Williamsburg, N. Y. 28

Machinists' Tools, *Makers of.*
Blaisdell P. & Co., Worcester, Mass. 33
Harrington Edwin, 15th st. and Pa. ave., Phila. 36
Star Tool Co., Providence, R. I. 36

Machinery and Tools, *Importers of.*
Churchill Charles & Co., 28 Wilson St., Finsbury, London, England 9

Mathematical Instruments.
Keuffel & Esser, 116 Fulton, N. Y. 36

Measuring Tapes.
Eddy Geo. & Co., 353 Classon Ave., Brooklyn, N. Y. 10

Meat Cutters. *Makers of.*
Whittemore D. H. Worcester, Mass. 7

Metal Dealers and Brokers.
Coddington T. B. & Co., 25 and 27 Cliff, N. Y. 2
Colt Edward W., 205½ Walnut, Phila. 4
Cort N. L. & Co., 220 & 222 Water, N. Y. 2
Crane U. O., 104 John, N. Y. 4
Gregg H. L. Co., 108 Walnut, Phila. 4
Holmes & Lissberger, 255 & 257 Pearl, N. Y. 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila. 16
Quincy J. W., 98 William, N. Y. 2
Thomson & Co., 213 and 215 A. A. Water, N. Y. 2
Van Wart & McCoy, 43 Chambers, N. Y 2

Metallurgists.
Britton J. Blodgett, 319 Walnut, Phila. 5
Drown Thomas M., 1123 Girard, Phila. 5
Maynard & Van Rensselaer, 24 Cliff, N. Y. 5
School of Mines, E. 49th, N. Y. 5

Mining Spikes
Roseberry Geo. D., Pottsville, Pa. 4

Molders' Tools.
Carter H. & Sons, 290 Pearl, N. Y. 27

Mouse Traps, Catchemalive, *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y. 36

Nickel Platers.
New York Nickel Plating Co., 133 West 25th, N. Y. 23

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, 948 Beach, Phila. 36

Note Broker.
Gallaudet P. W., 3 and 5 Wall, N. Y. 2

Nuts, Bolts, etc., *Makers of*
American Bolt Co., 210 Lawrence, Lowell, Mass. 13
Arms, Bell & Co., Youngstown, O. 12
Carpenter David, 402 Water N. Y. 4
Clark Bros. & Co., Milldale, Conn. 12
Fuller, Lord & Co., Boonton, N. J. 4
Haskell W. H. & Co., Pawtucket, R. I. 12
Old Colony Rivet Works, 116 Chambers, N. Y. 12
Roseberry Geo. D., Pottsville, Pa. 4
Russell, Birdsall & Ward, Port Chester, N. Y. 36
Plumb, Burdict & Barnard, Buffalo, N. Y. 36
Sternbergh J. H., Reading, Pa. 12
Union Nut Co., 78 Beekman N. Y. 27

Oilers, *Makers of.*
Austin J. & Co., 168 Fulton, N. Y. 12

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia 5

Ore Crushers.
Blake Crusher Co., New Haven, Ct. 34

Paints.
Rocky Mountain Vermillion Paint Co., Prov., R. I. 3

Paints and Oils, *Dealers in.*
DeVoe F. W. & Co., 117 Fulton, N. Y. .....

Patent Solicitors.
Brieson A. V., 258 Broadway, N. Y. 16
Howson & Son, Phila. and Washington, D. C. 13
Whitney J. A., 128 Broadway, N. Y. 18

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y. 3

Pipes, Fittings, etc., *Makers of.*
Eaton & Cole, 38 John, N. Y. 26
McNab & Harlin Mfg. Co., 56 John, N. Y. 22
Nelson, Finkel & Co., 439 E. 10th st., N. Y. 22
Pancoast & Maule, 227 Pear, Phila. 22
Chas. Gregg Mfg. Co., 62 and 64 Gold, N. Y. 22

Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 112 Leonard, N. Y. 6
Graff William & Co., Pittsburgh, Pa. 22
McNeal John & Sons, Burlington, N. J. 6
Morris, Tasker & Co., 15 Gold, N. Y. 22
National Tube Works Co., 78 William, N. Y. 22
Starr Jesse W. & Sons, Camden, N. J. 6
Warren Foundry & Mach. Co., Phillipsburg, N. J. 22
Wood R. D. & Co., 173 Broadway, N. Y. 2

Piston Packing.
Canfield John & Co., 131 Fairmount Ave., Phila. 30

Plane Irons, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn 6
Middletown Tool Co., Middletown, Conn. 8
Sandusky Tool Co., Sandusky, O. 10

Planes, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn. 6
Greenfield Tool Co., Greenfield, Mass. 21
Ohio Tool Co., Columbus, O. 8
Stanley Rule & Level Co., 55 Chambers, N. Y. 12

Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y. 6

Plumbers' Materials, *Manufacturers of*
Carr Wm. S. & Co., 106 Centre, N. Y. 32

Portable and Stationary Forges.
Kellogg Wm. P. & Co., 121 Chambers N. Y. 34
Keystone Portable Forge Co., 120 Exchange place, Philadelphia. 6
Manning H. S. & Co., 111 Liberty, N. Y. 6

Presses, Power. *Makers of.*
Am. Saw Co., Trenton, N. J. 26
The Stiles & Parker Press Co., Middletown, Ct. 35

Pressure Blowers. *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston 35

Pumps, *Makers of.*
Burlingham & Purdy, 103 Chambers St. 7
Douglas W. & B., Middletown, Conn. 7
Rumsey & Co., Seneca Falls, N. Y. 7
Union Mfg. Co., 99 Chambers, N. Y. 7
Valley Mch. Co., Easthampton, Mass. 7

Pyrometers.
Brown Edward, 311 Walnut, Phila. .....

Railroad and Miners' Tools.
Hogan, Clark & Sleeper, Boston 9

Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y. 32
Smith Gilead A. & Co., 62 Broadway, N. Y. 4

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa. 6
Cambria Iron Co., Johnstown, Pa. 5
Cleveland Rolling Mill Co., Cleveland, O. 6
Griswold John A. & Co., Troy, N. Y. 32
Milwaukee Iron Co., Milwaukee, Wis. 6

Razor Straps, *Makers of.*
B. F. Badger, Charlestown, Mass. 6

Refrigerators,
Lesley Alex. M., 224 W. 23d, N. Y. 26

Rivets.
Old Colony Rivet Works, 116 Chambers, N. Y. 12
Timmes Peter, 251 North 6th, Brooklyn, E. D. 4

Rolling Mill Machinery, etc., *Manufacturers of.*
Birmingham Iron Foundry, Birmingham, Ct. 4
Moore James, Cor. 16th and Buttonwood, Phila. 35

Rolls, Chilled and Sand, *Makers of.*
Garrison A. & Co., Pittsburgh, Pa. 4

Rules, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Ct. 6
Stanley Rule and Level Co., 55 Chambers St. 22

Sash Chain.
Thomas Morton, 15 Murray, N. Y. 21

Saws. *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind. 10
American Saw Co., Trenton, N. J. 10
Boynton E. M., 80 Beekman, N. Y. 10
Flint J., Rochester, N. Y. 10
Disston Henry & Sons, Phila. 25
McNeice Wm., 515 Cherry, Phila. 10
James Ohlen, Columbus, O. 10
Peace Harvey W., Williamsburg, N. Y. 10
Spear & Jackson, 116 Duane, N. Y. 29
Wheeler, Madden & Clemson, Middletown, N. Y. 10

Saw Frames, Wood, *Makers of.*
Boynton E. M. 80 Beekman, N. Y. 10
Peace Harvey W., Williamsburg, N. Y. 10

Scales. *Manufacturers of.*
Richie Bros., 9th near Coates, Phila. 8
Shattuck W. F. & Co., 113 Chambers, N. Y. 8

Screws. *Makers of.*
American Screw Co., Providence, R. I. 13
Miles F. S., 206 Quarry, Phila. 12

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y. 5
Field Alfred & Co., 47 John, N. Y. 23
Gueutal George & Son, 39 W. 4th, N. Y. 10

Shovels, &c.
Birmingham Shovel Co., 31 Chambers, N. Y. 9
Clement & Hawkes Mfg. Co., Northampton, Mass. 4

Skates.
Graham & Haines, 86 Chambers, N. Y. 31

Smelting Works.
Reeves Paul S., 700 South Broad St., Phila. 36
Du Plaine & Co., 1320 Callowhill, Phila. 31

Stamped and Japanned Tin Ware.
Scheider Jos. & Co., 58 Beekman, N. Y. 6
Shepard Sidney & Co., Buffalo, N. Y. 27

Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y. 35

Snaps, Harness. *Makers of.*
Middletown Tool Co., Middletown, Conn. 28

Spiegel.
Quincy John W., 98 William, N. Y. 2

Squares, Steel and Iron, *Makers of.*
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y. 9

Steam Pumps, etc., *Manufacturers of.*
Carr A. 43 Cortlandt, N. Y. 29
Guild & Garrison, Williamsburgh, N. Y. 34
Hall C. Henry & Co., 30 Cortlandt, N. Y. 22
Philadelphia Hydraulic Works, Evelina street, east of Third street, Phila. 34
Steele & Condict, 88 Liberty, N. Y. 29

Steam Traps.
Alonzo L. Jones, 150 S. 4th, Phila. 22

Steel Castings.
The McHaffie Steel Castings Co., Evelina and Levant Streets, Philadelphia 16

Steel Importers.
Carr J. & Riller, 82 John, N. Y. 32
Cocker Bros., Sheffield, England 12
Congreve Chas. & Son, 104 and 106 John, N. Y. 32
Hobson Francis & Son, 97 John, N. Y. 12
Jessop Wm. & Sons, 91 and 93 John, N. Y. 32
Moss F. W., 80 John, N. Y. 32
Piersons & Co., 24 Broadway, N. Y. 4
Sanderson Bros. & Co., 16 Cliff, N. Y. 32
Sanderson Geo. & Co., 57 John, N. Y. 32
Van Wart & McCoy, 43 Chambers, N. Y. 32
Wardlow S. & C., 18 Gold, N. Y. 32
W. Hawksworth, Ellison & Co., 72 John, N. Y. 32

Steel Manufacturers.
Anderson & Woods, Pittsburgh. 33
Chrome Steel Co., Brooklyn, E. D. 32
Cleveland Rolling Mill Co., Cleveland, O. 6
Gautier D. G. & Co., Jersey City, N. J. 32
Griswold John A. & Co., Troy, N. Y. 32
Hussey, Wells & Co., Pittsburgh. 32
Miller, Barr & Parkin, Pittsburgh. 32
Reiter, Sutton & Co., Pittsburgh, Pa. 33
Reese, Graff & Woods, Pittsburgh. 33
Rowland Wm. & Harvey, Frankford Phila. 36
Singer, Nimick & Co., Pittsburgh. 32

Stone Crushing Machines.
Blake Crusher Co., New Haven, Ct. 9

Stoves.
Burdett, Smith & Co., Troy, N. Y. 24

Stove Boards, *Manufacturers of.*
Shepard Sidney & Co., Buffalo, N. Y. 27

Stove Polish, *Makers of.*
"Gem" Stove Polish, 172 Forsyth, N. Y. 36

Twist Drills, *Makers of.*
Morse Twist Drill & Mach. Co., N. Bedford Mass. 31

Tackle Blocks, *Makers of.*
Burr & Co., 81 Peck Slip N. Y. 31

Tacks.
American Tack Co., 117 Chambers, N. Y. 13
Field A. & Sons, Taunton, Mass. 9
Grundy & Kenworthy, 165 Greenwich, N. Y. 32
Dunbar,

Eastern Artisans.

A correspondent of the *English Mechanic* writes as follows concerning the artisans of Eastern countries:

In offering some random observations on this subject I do not pretend to bring forward any new discovery in the way of mechanical construction from workmen who, from the long habit of using Nile mud only in their building operations, and of dabbling together various articles for domestic use of the same material, have consequently but a very crude notion of making anything either straight, square or round. A few points, however, attracted my attention, that may bear curious comparison with the refined mode of working in other countries.

During a stay of several weeks in one place on the banks of the Nile, some half dozen men brought down on the backs of donkeys a quantity of second-hand timber, of every variety of shape and dimension. One of the gang set to work on a large bag of old bent rusty nails of all sizes, and proceeded to straighten them by laying them in a charcoal fire, picking out the hottest as they came, with a pair of forceps, and flogging them out upon a block of granite. I soon saw that it was their intention to build a candjia, or small trading boat, for sailing up the river, from the banks of which another man fetched a number of basket loads of mud, and built up an arrangement for melting pitch; this was constructed of mud and bore a grotesque resemblance to a common laundry copper.

With a proper selection of crooked pieces of wood, and others made to suit by diligent adzeing, the framework of the vessel was quickly set up bottom uppermost, each rib as it was added being held in place by a temporary stretcher, aided beneath by props of mud. No mold boards were used that I could perceive, nor reference made to any plan; the model was arranged apparently by sight. The ribs, when all in place, presented a very fair outline of the usual Nile form of hull, that is, with the heaviest draught forward. As to the formation of these ribs, they had to cut their coat according to their varied stock of cloth, and no one matched the other in size and quality of timber. For example, there would be a square section of rib on one side, and the opposite one consisted of a round piece of wood, if it happened to suit in outline, and perhaps a long rib in another pair would be matched by several short bits, to make up its fellow, but these irregularities were distributed judiciously with regard to strength. Next came the planking, and in this they displayed their best skill. The only cutting tool employed was the "quadoom," a kind of short-handled adze, which they used very dexterously, trimming the edges of the planks to a pretty close fit where they came together. The back of the adze served as a hammer, and as in all their kit they only had the fragment of a saw, most of the planks were cross-cut by notching on each side, breaking off the piece and trimming the end with this universal tool. In order to economize wood (which is very scarce and dear in the country) the planks were not cut to match, or to waste, but laid on in all sizes and lengths. As soon as there was sufficient planking to hold the ribs together, the vessel, by dint of much heaving and shouting, was rolled over so as to lie in all positions, for convenience of working. The seams were caulked just the same as here, and when this rudely constructed vessel was finished and payed, it was surprising how well and shapely she looked. Like all of her class, with cargo on board, the gunwale would be only just above the water level, therefore the most cazy planks were reserved for the barrier of wash boards made water tight, and fortified outside by a stately embankment of Nile mud, which in that country dries again very soon after it is wetted. Treenails were not used in the construction, for of these they seemed to have no idea; in fact, they had no augers in the proper sense of the term. If a hole of extra large size was required it was reamed out from a smaller one, with a cross-handled implement having a flat bit, shaped like the blade of an oyster knife. The whole hull was fastened together by an enormous amount of nailing, and as this required a vast number of holes to be bored, these were made with an ease and celerity that would have put our best modern gimlets to shame, for much of the wood was acacia, and rather hard. The tools used were a kind of drill constructed as follows: A short stout piece of iron wire was driven into the end of a straight stick or staff, about 1 inch in diameter, and from 12 to 18 inches long. An old ferrule or a few coils of wire prevented the ends from splitting. An inch of the other end of the staff was cut round as a shoulder, and the projecting piece whittled into a kind of knob, which was forced into a hole bored in a nut of the Doum palm. This knob must be rather larger than the entrance of the hole in the nut, and this having been scooped hollow when the staff is driven in, the nut, though quite loose, cannot fall off again. This served the same purpose as the handle of a joiner's center brace, and as the ivory like substance of the nut is of an unctuous character, the rubbing parts do not chafe, but acquire a fine polish. This tool is used by grasping the nut as a handle, and rapidly rotating the staff by a drill-bow, consisting of the leaf stalk of the date palm, strung with a thong of hide. The various sizes of wire were quickly sharpened by merely hammering the end on a piece of iron and then rubbing them on a lump of grit stone.

This leads to a description of the way in which the Turkish pipe stems are bored. Curiosity prompted me to ascertain how this was done, for some of the stems are six feet long and drilled quite true and central throughout. The best sticks are said to come from the country near Constantinople, and are cut from a kind of dwarf cherry, specially cultivated for the purpose, and trained to grow perfectly straight; many are, however, obtained from oleander bushes in the valley of the Jordan. If the sticks are not quite straight when they reach the pipemaker's hands he soaks them and dries them again under due pressure.

The workman squats before a log of wood driven into the ground or floor. In the top of the log there is an upright iron pin about an inch and a half long; a bobbin exactly resembling a common cotton reel fits freely upon this pin. In the top of the bobbin is driven an iron wire punch less in diameter than the intended bore of the pipe; the upper end of this wire is spread out by hammering, and made sharp like a brad awl. A conical center hole is dug out in the end of the stick to be drilled, this is set on the top of the sharp wire, which is rotated rapidly to and fro with a bow, the thong of which passes round the reel. For convenience, the work is usually begun with a short wire drill, and when all of this has entered, a longer piece with its attached reels, is substituted. The drill acting vertically, the fine borings fall directly out without clogging, or the necessity of withdrawing the drill till the work is completed. There is, however, one very important condition essential to the success of the operation. While the stick is being drilled, it must be held somewhat loosely in the hand so as to be continually shifting round; if this is not attended to, the bore is sure to run out of the center of the stick. This may be exemplified by the operation of drilling up a brass wire for the purpose of forming a tube or small bore. If we attempt to accomplish this by fixing the wire in a vice, however carefully the drill is used, it will run out to one side before it has gone an inch deep. But if, on the other hand, the drill (formed of a piece of steel wire sufficiently long) is held as a fixture in the vice and the wire to be drilled rotated on to it with a bow (the wire having a reel thrust on to it for that purpose) the bore will continue exactly in the center of the wire. One end of this is pointed to run in the breast plate, and the other is marked with a center punch, so as to run true on the drill point; this will come out at last precisely in the center or point of the wire.

Digressing from the question, in certain cases of moving the tool or the reverse in the rotating work, it may be remarked, that in screwing wires, a far truer thread is obtained when the work is turned into the dies, and skilled gas fitters well know that they get a thread free from drunkenness by fixing their die stocks in the vice and screwing the gas pipes into them.

Analogous to the pipe-stem boring, is the operation of the machine employed at the small arms factory at Enfield, for drilling out the long hole in wooden gun stocks for containing the ramrod. This is done with a long shell auger, but if this alone revolved the hole would never continue straight, but tend to follow the grain of the wood, as the slender bit is elastic and yielding. In order to prevent this, while the bit is rapidly revolving, the gun stock also revolves more slowly in an opposite direction; this causes the hole to run true, however cross-grained the wood may be.

I once entered an armory in the East, where they were stocking and putting together common flint lock horse pistols, a brace of which every swaggering fellow likes to carry in his belt during an excursion. I, however, left in disgust, seeing that there was nothing to learn. They had no work benches, but were all seated cross-legged on the ground, some using their naked feet to hold the work, a very common practice throughout the country, for when a man has gone all his life-time without shoes and stockings, his toes get properly exercised and developed, and become rather prehensile. At Cairo I once stopped to look into the stall of a man who had mounted a grindstone, and gained his living by grinding edge-tools. There was no treadle fitted, he sat at the stone bicycle fashion, and turned the handle directly with his foot, hooking his great toe on to the iron crank-pin, round the end of which it had worn out a soft luxurious hollow, having an exquisite polish.

A number of fire-arms of the rudest construction are yet made in the East by the Arabs, but they all appeared to me to be very insufficient and harmless, and the old matchlock is still carried by some of the wandering tribes. During our travel through a part of Samaria, it was considered prudent to hire a government escort, as the authorities then, to some extent, became responsible for any outrage on travelers. Accordingly we were provided with two "soldiers," mounted on pretty fleet horses, but the men had nothing, in dress or appearance, to denote a military calling, or anything in their favor to distinguish them from the thieves against which they were sent to protect us. One of them was armed with a long spear only, the other had dangling at his side a most ridiculous abortion in the shape of a blunderbuss of native manufacture, only eighteen inches in length. This suspended by a single sling from his neck, danced frantically about as he rode. The stock was too short to be held to the shoulder, and it would have to be fired pistol fashion. The muzzle of the barrel was as large as an egg cup, and the bore dwindled down to the size of a candle socket at the breech. Irrespective of the moral effect its appearance might produce, I concluded that, practically, this must have been more a weapon of castigation than destruction, for if loaded with a charge of slugs, and fired into a group of men at a few yards distance, from its scattering proclivity, it would probably hit them all, and might perhaps break the skin and draw blood in a bare place without the risk of penetrating.

An Arab once undertook to guide us to a place where sport was to be had in shooting hares. He himself was armed with a native flint musket, tremendously long in the barrel; this was fastened to the wood-work of the stock by some dozen brass bands or ferrules, which he prided himself in keeping particularly bright. He soon shot a sitting hare, creeping up as close as possible. He asked us to reload his piece; this we were about to do with three drachms of English sporting powder. He said this would not do, as his gun would not kill unless it had six or eight drachms; this we gave him on his own responsibility, thinking it not unlikely that with our powder his frail piece would be blown to bits, as the substance of the barrel was scarcely larger at the breech than at the muzzle. When he fired again he neither hurt himself nor the game. An examination of the weapon explained the mystery, for the touch hole was quite one-quarter of an inch in diameter, thus acting as a kind of safety valve, giving vent to more than half the force of the powder while the surplus was driving the charge. Barbarous as these weapons are, both in design and workmanship, yet the barrels of some of them are fine specimens of forging. I particularly remarked one piece; it was a short carbine, with silver bands to hold the barrel to the stock, which was also ornamented with silver. The barrel had not been bored, and was of a very curious pattern, not a spiral twist like ours, but an assemblage of fine bright fibres crossing in every direction. I was told that this was made at Damascus, and during my stay at that city I entered a smithy where arms were made.

The only fuel was a fine quality of hard wood charcoal. The bed of the forge was raised the same as here, but the curious feature was the back, which consisted of a slab of a light porous kind of fire-stone. Under this the blast entered, the tuyere appeared to me not to be a round aperature as with us, but was extended horizontally about two inches. Opposing the back there was a similar slab of fire-stone, which was set at various distances, according to the magnitude of the work to be heated. If this was small there was not more than an inch between the slabs for containing the ignited charcoal. The faces of the stone acquired a white heat, which was thus confined and reverberated on to the work, with but a small consumption of fuel. There were two single bellows of a circular form, connected by a rocking staff, so that while one of them was brought down the other was being raised and filled, thus giving a continuous blast. It might be supposed from this description that the arrangement was rather a primitive and ineffective one, but the work done proved quite the contrary. The superiority of all ironwork forged with charcoal is well known, but if this were used in our form of forge with weighted bellows, it would be rapidly blown away. In the Damascus forge the pressure is obtained by the direct muscular force of the arm, so that the smith can regulate his blast by feeling, and instantly increase or diminish its force, or stop altogether, according to the state of the work; and the charcoal being confined in a narrow space between two walls of non-conducting fire-stone, the escape of heat as well as fuel is prevented.

Foundry Charcoal.

A writer in *Iron* says:

The preparation of charcoal or "black" for foundries was formerly carried on in the works themselves, and, as the subject had not been scientifically studied, the charcoal was often inferior in quality and the molds deteriorated thereby.

M. Jules Mailfert took up the subject some time since, and has established an extensive manufactory for this special product, which won him a medal last year at Vienna.

The part which the charcoal plays in the molds is to give porosity and facilitate the escape of the gases and steam caused by the molten metal. There are three sorts in use in French foundries known as mineral charcoal, vegetable charcoal and stove charcoal. The first of these is made from coal finely pulverized, and is mixed with the sand used for casting pieces of small dimensions and little thickness; these molds are called "green sand molds." But all sorts of coal are not equally good for the purpose, some kinds give a white appearance to cast iron, and produce on the surface and chiefly at the extremities of the castings rough spots which the file will not touch, and which have the appearance of having been run at too low a heat. M. Mailfert has tried many kinds and finds that *gras*, or bituminous coal, is the best, and says that, when used in small quantities and finely sifted, its action is perfect, and it gives to the casting that bluish lustre which is highly esteemed.

The vegetable charcoal is made from carefully selected wood burnt in a special manner. The principal quality required in it is, that it should not catch fire, and it is used principally for powdering the surface of the mold so as to prevent the contact of the molten metal with the green sand. It is reduced to such impalpable powder that the spatula used for spreading it in the mold gives it a surface almost as brilliant as glass; it is called *gras*, or fat charcoal, a quality derived from the mode of burning, and it will neither roll before the trowel or spatula, nor stick to it.

Stove-black is used for the same purpose in the case of large heavy castings, as the other kind will not bear excessive heat. This is simply mixed with water and applied rather thinly. A thick coating is not considered good.

M. Mailfert has established a factory for these charcoals at Chatillon-sur-Seine, in the Cote d'Or, in the forests of which is found the kind of wood required for the vegetable charcoal, and on such a scale as to employ steam to the extent of 100 to 150 horse-power. It is said, moreover, that by his processes an economy of from thirty to forty per cent. is effected in the expense of these blacks.

Mr. H. W. Merrill is working a very rich vein of manganese in Huntington county, N. J., near the town of Clinton. The vein is 3½ feet in thickness, and contains 47 per cent. of metallic manganese, which has been pronounced of superior excellence for the manufacture of crucible steel. Dr. S. H. Cook, State Geologist, of New Jersey, has carefully examined the vein, and warmly recommends the manganese to steel manufacturers.

Leather Belting.

PAGE BELTING COMPANY.

Sole Manufacturers of

TRADE MARK.

Page's PAGE'S PATENT TANNED Leather manf'd under Pat. MAY 9—1866. FAT. SEPT. 12, 1871. Patent Tanned Belting.

GENERAL MILL SUPPLIES.

No. 24 Exchange Street, Boston.

BRADFORD & SHARP,

Manufacturers of

LeatherBelting

OAK TANNED,

57 Walnut Street, Cincinnati, O.

We furnish many of the largest Iron Mills in the West, and guarantee quality of all goods sold.

Send for prices

Alexander Brothers,

Manufacturers of **OAK TANNED**

LeatherBelting

410 & 412 North 3d. Philadelphia, Pa.

ANOTHER CRUSADE

Against the present style of Wood Cooks, with their small Fire Boxes, Shallow Ash Pits, Cold Reservoirs and Cheerless Fronts.

Mr. Blivens. "This must be the place to make the Fire, it is the only place in the stove that is big enough."
Mrs. B. "My child, you will get your death of cold playing in that reservoir."
BISMARCK
The largest Fire Box, The best Reservoir, The brightest Front and The deepest Ash Pit of any stove made.
Judge S. "I despise a stove that isn't any more cheerful than a refrigerator."
Miss Murphy. "I can't stay, there's no ash pit to your cook stove, sure I thought you had an Bismarck."

Manufacturers of the Celebrated Soft Coal Base Burner DUBUQUE.

See their Prices before buying Elsewhere.

Entered according to Act of Congress in the year 1874, by BURDETT, SMITH & Co., in the office of the Librarian of Congress, at Washington.

The **BISMARCK** is a Large and Cheap Wood Cook Stove, that can be readily sold, even in these dull times. Send for prices, also for circulars containing the funny letters from Blivens, Miss Murphy, &c.

BURDETT, SMITH & CO., 253 River St., Troy, N. Y. 538 S. Clark St., Chicago, Ill.

T. A. WESCOTT, 83 & 85 Blackstone St., Boston, Mass.

HENRY DISSTON & SONS,

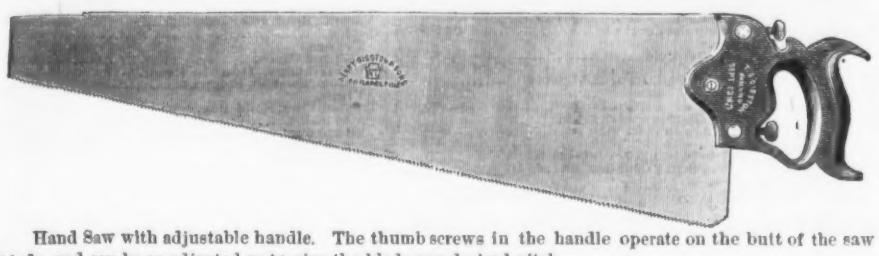
Keystone Saw, Tool, Steel and File Works,

PHILADELPHIA.

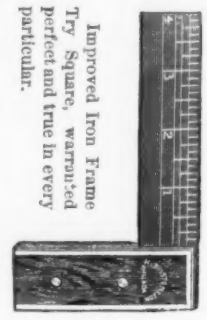
Manufacturers of SHEET STEEL, and all Articles made from Sheet Steel.

SAWS OF EVERY DESCRIPTION.

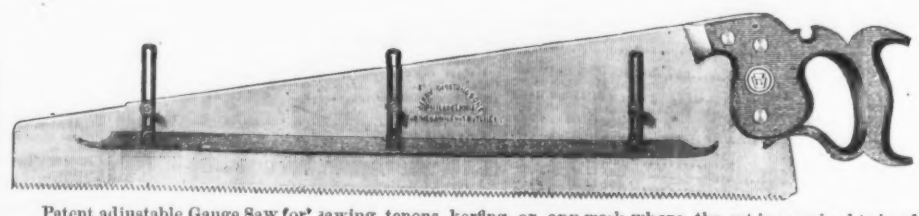
Also, FILES, TOOLS, Etc., and all kinds of Labor Saving Implements for keeping Saws in perfect order.



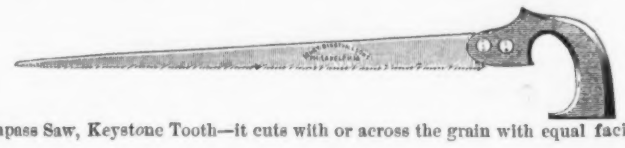
Hand Saw with adjustable handle. The thumb screws in the handle operate on the butt of the saw blade, and can be so adjusted as to give the blade any desired pitch.



Improved Iron Frame Try Square, warranted perfect and true in every particular.



Patent adjustable Gauge Saw for sawing tenons, kerfing, or any work where the cut is required to be of definite depth. Will pay for itself in one day. Try it and be convinced. Remove the gauge and use as an ordinary saw.



Compass Saw, Keystone Tooth—it cuts with or across the grain with equal facility.

Hack Saw. The blade in this Saw is reversible, an advantage which will be readily appreciated by mechanics.

READ, MARK, LEARN.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

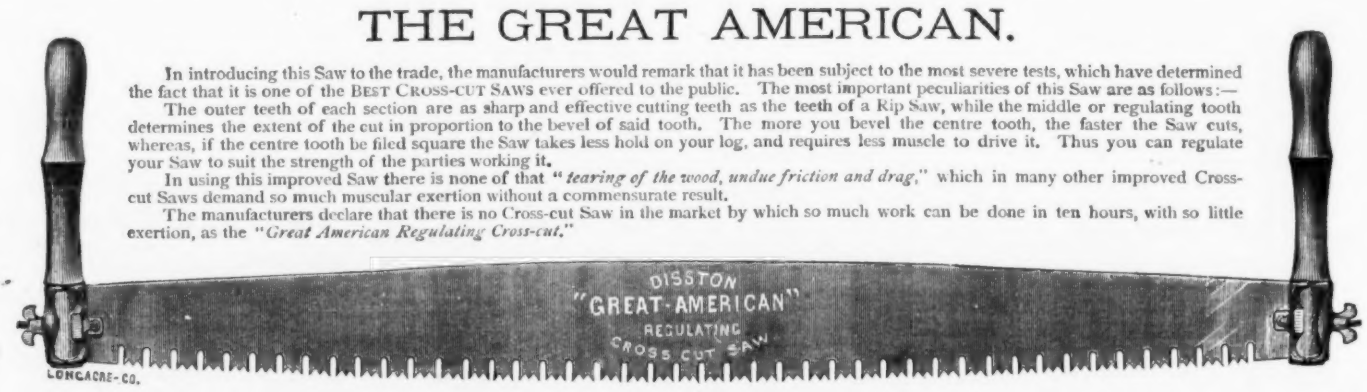
The test of practical experience has been ap-

plied, the verdict given, the fiat has gone forth, and the Humbugs are fast fizzling out, while our rapidly increasing sales testify to the esti-

mation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

THE GREAT AMERICAN.



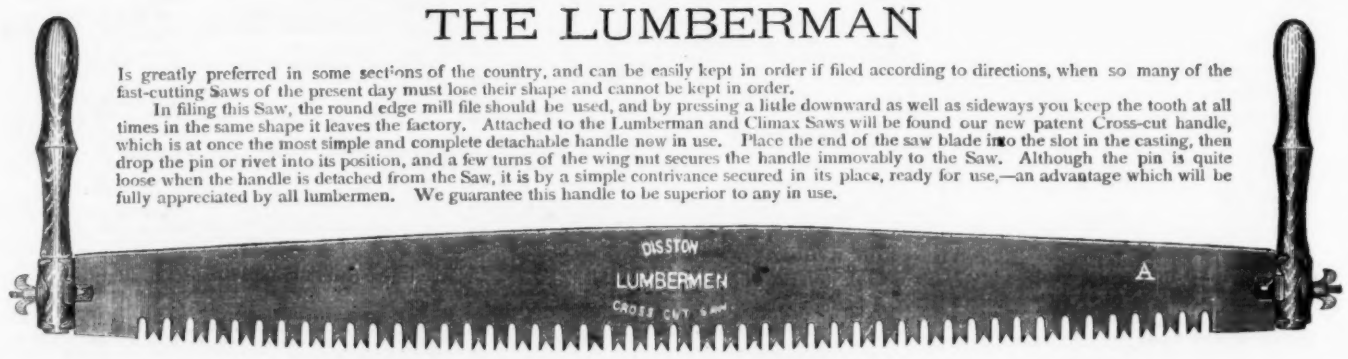
In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag*," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"

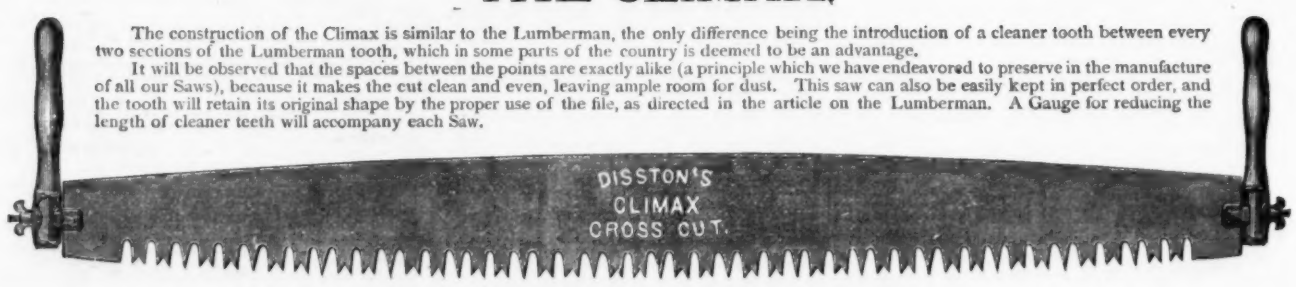
THE LUMBERMAN



Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.

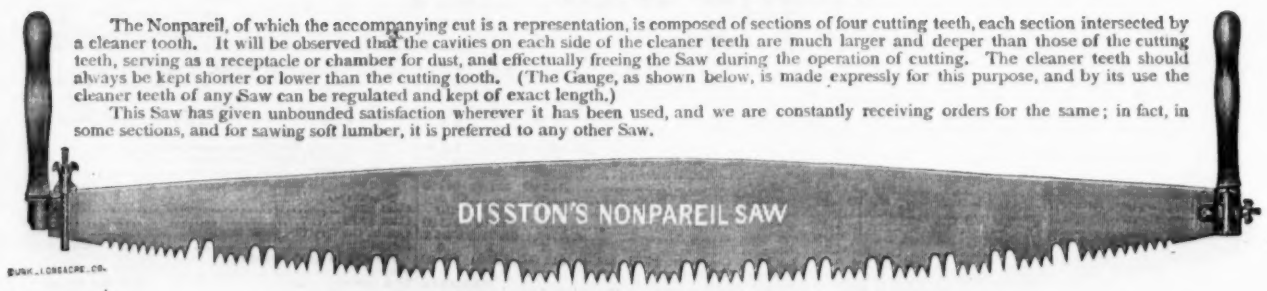
THE CLIMAX.



The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.

THE NONPAREIL.



The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.

Plain Truths for Practical Men.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

The test of practical experience has been ap-

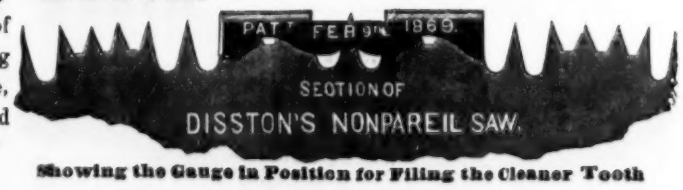
plied, the verdict given, the fiat has gone forth, and the Humbugs are fast fizzling out, while our rapidly increasing sales testify to the es-

timation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

Gauge for Regulating Cleaning Teeth.

The cleaning teeth of all saws should be somewhat shorter than the cutting teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the cutting teeth, the cleaning teeth projecting through the opening in centre of Gauge. Reduce the projecting points, by means of a file, until arrested by the edges of the Gauge, which is made of hardened steel. Thus tooth after tooth can be rapidly and correctly reduced to an even length by any unskilled operator



Showing the Gauge in Position for Filing the Cleaner Tooth

New York Wholesale Prices, August 12, 1874.

HARDWARE.

Anvils.
Solid Cast Steel.....₩ ℔ 14c
Wright's.....₩ ℔ gold 13c; over 250 ℔s 13½c, gold
Armitage's Mouse Hole.....gold 11c
Wilkinson's.....₩ ℔ gold 11¾c
Eagle Anvils, ₩ ℔ 11c currency.....dis 15&10 %

Apple Parers.
Domestic.....
Turn Table.....
Lightning.....
Hudson's.....$8·00 ₩ doz
Reading.....
Union.....
Skeleton Paring, Coring and Slicing.....
Bay State, Paring, Coring and Slicing.....$15 00 dis 5 %
Climax Slicer.....
Bay State Peach Parer.....$11 00 @ 11 50
Lightning " " .....11 00 @ 11 50
Peach Stoner and Halver.....7 00

Augers and Bits.
Snell Mfg. Co.....dis 15 @ 20 %
Russell Jennings.....dis 10 %
Douglass Mfg. Co., Extra.....
" " No. 1.....
" " Hollow Augers.....dis 20 %
Cushman's Expanding Hollow Augers.....dis 30&10 %
Ives' Augers and Bits.....dis 30&10 %
" Gouge Lip Augers and Bits.....dis 30&10 %
" Hollow Augers.....dis 30&10 %
" Expansive Hollow Augers.....dis 30&10 %
" Expansive Bits.....dis 20&10 %
Andrews' Bits.....dis 25 %
Clark's Expansive Bits.....dis 15 %
Cook's Patent Augers.....dis 50 %
" " Bits.....dis 40&10 %
Shepardson's Double Cut Bits.....dis 20 %
Griswold's Patent.....dis 30&10 %
CastSteel Cut Augers.....dis 30&10 %
" Auger Bits.....dis 10&10 %
Gimlet Bits.....new list dis 30 %
Long Augers.....new list dis 30 %
Bonney's Patent Hollow.....$48 per doz—dis 25 %
Stearns' " " .....$48 per doz—dis 25 %
Morse's Bit Stock Drills.....dis 20 %
Nobles Mfg. Co. C. S. Cut Augers.....dis 30&10 %
Watrous Snip Augers.....dis 15 %
Vaughan's Post Hole—
6 in. $23 60; 9 in. $25 per doz.....dis 20 %

Axes.
Brook's.....per doz $12 00 @ 14 00 net
Blood's.....per doz $12 50 @ 14 00
Hunt's.....₩ doz $14 00 @ 19 00 dis 5&2½ % cash
Collins'.....₩ doz 11 00 @ 15 50 net @ dis 5 %
Hurd's.....₩ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s.....₩ doz 13 00 @ 15 00
Simmons'.....₩ doz 12 50 @ 14 00
Morris'.....₩ doz 12 50 @ 13 50
Red Jacket.....₩ doz 12 00 @ 12 50
Mann's.....₩ doz 12 50 @ 13 00
Double Bitted.....₩ doz 21 50 @ 22 00
Lowell Tool Co., "Peerless".....₩ doz 13 00 @ 14 50
Underhill's.....₩ doz 12 00 @ 13 00
" Crown.....₩ doz 12 50 @ 13 50
John Leverett's.....₩ doz 12 50 @ 15 50
Nobles Mfg. Co. S. B.....₩ doz 12 50 @ 13 00
" D. 3.....₩ doz 22 00 @ 23 00

Balances.
Chatillon's.....
Frary's.....} new list dis 15 %
Morton's.....

Bands.
Plated.....new list dis 50&5 %
Iron Rim.....new list dis 25&5 %
Brass (Plated list).....new list dis 50&5 %
Oroide.....new list dis 50&5 %

Bells.
Hand, Light Brass.....dis 66⅔&10 %
White Metal.....dis 50&10 %
Swiss.....dis 50 %
Hotchkiss'.....dis 15&10 %
Abbe's.....dis 10&10 %
Taylor's Patent Door.....dis 25 %
Western Gong.....dis 25 %
Brook's Crank.....revised list dis 50 %
" Pull.....revised list dis 50 %
Hart Mfg. Co., Crank and Pull.....dis 50&10 %
Cow—Common Wrought.....dis 20&10 %
" Western.....new list dis 30&10 %
" Kentucky "Star".....new list dis 20&10 %
" Dodge's Genuine Kentucky.....new list dis 35 %
" Yaw's Genuine.....dis 20 %
" Texas.....dis 35 %
Call.....dis 15 %

Bellows.
Blacksmiths'.....dis 20 %
Moulders'.....dis 15 %
Hand Bellows.....dis 10 %

Blind Fasteners.
Van Sand's.....₩ gross $14 00
Washburn's Patent.....₩ gross 14 00
Merriman's.....

Blind Staples.
Boardman's Patent, ½ in. and larger.....₩ ℔ 37 c
" ⅝ in....." 42 c

Bolts.
Carriage and Tire, Ætna Nut Co.....dis 60 %
Stove, Ætna Nut Co.....dis 10&5 %
Cast Iron Barrel, Shutter, &c.....new list dis 60&10 %
Wrought Iron Barrel.....new list dis 50&10 %
" " Square.....new list dis 50&10 %
Wrought Iron Plush.....dis 15 %
Carriage and Tire, Common.....dis 70&10&5 %
" " " Norway Iron.....30&10 %
Star, Philadelphia.....dis 50 @ 50&10 %
Eagle, Philadelphia.....dis 50 @ 50&10 %
Philadelphia Pattern, P. S. & W.....dis 50&10 %
Tire, Bessemer Steel, Hubbard & Curtiss.....dis 50 %
Carriage and Tire, R. B. & W.....old list dis 50&5 %
Plow, R. B. & W.....dis 30 %
Stove, R. B. & W.....dis 10 %
" Shelton Co. Shaved Heads.....dis 15 %
Union Nut Co., old list.....dis 50&2½&5 %
" " Stove.....dis 15 %
Machine.....dis 60 @ 45 %
Borax.—In cases of 100 lbs.....₩ ℔ 16c

Boring Machines.
Kellogg's.....dis 15 %
Snell Mfg. Co., Rice's Patent.....dis 15 %
" " Regular.....dis 15 %
Douglas Mfg. Co.....dis 20 %
Mortising Machines each.....$18 00

Bow Pins.—Union Nut Co., new list.....dis 50&10 %

Braces.
Barber's Patent.....dis 40&5 %
Q. S. Backus.....dis 40&10 %
Wilson Mfg. Co.....new list dis 10 %
Spofford's Patent.....dis 40&5 %
Noble's Patent.....dis 10&10 %
Bartholomew's American Ball Patent Grip.....dis 40 %
Ives' Novelty.....dis 40&5 %

Bull Rings.—Union Nut Co., new list.....dis 50&10 %

Bung Hole Borers.
Common and Ring.....dis 25 %
Enterprise Mfg. Co.....dis 20 %
Ives' Tap Borers.....dis 25 %

Butchers' Cleavers.
Hunnson & Bukley Mfg. Co.....dis 20&10 %
bradley's.....dis 25 %
Beatty's.....new list dis 10 %

2	3	4	5	6	7	8
$19·00	$21·50	$24·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4
$25·25	$29·75	$30·25	$38·75	$43·55	$48·50	$54·00

Butts.
Wrought Brass.....new list dis 30 %
Cast Fast Joint, Narrow.....dis 50&5 %
" " Broad.....dis 50&5 %
Cast Loose Joint.....dis 60&5 %
" " Mayer.....dis 50&5 %
" " Parliament.....dis 50&5 %
Drilled Wire Jointed—
Narrow.....dis 50&10 %
Broad.....dis 50 %
Loose Joint.....dis 60 %
Mayer's.....dis 50 %
Parliament.....dis 50 %
Loose Pin.....dis 5 %
Wrought Fast Joint, Narrow.....dis 30 %
Wrought Broad.....dis 35 %
" Loose Joint.....dis 35 %
Wrought Table and Back Flaps.....dis 30&10 %
Palmer Blind Butts.....dis 30&10 %
Nicholson Blind Butts.....dis 40&10 %
Parker's Blind Butts.....dis 55&10 %
Huffer's Blind Butts.....dis 30&10 %
A. S. Parker's.....dis 40&10 %
Clark's Surface Blind Hinges, Nos. 1, 3 and 5.....dis 55&10 %
" " " No. 20.....dis 55&10 %
" Mortise " No. 2, 4, 4½, 6, 8, 10.....dis 35 %
Seymour's.....dis 55&10 %
Shepard's.....dis 55&10 %
Garretson's.....No. 1, dis 5&10 %; Nos. 2 and 7 dis 55&10 %
The American Spiral Spring Butt Co.....dis 20 %
Standard.....dis 55&10 %

Caps—Percussion, per 1000.
G. D.....35c
Ely's E. B.....1-4s, 58c.; 1-10s, 65c., gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52½c., gold
Colt's.....1-10s 70c., gold

Carpet Sweepers.
Unique.....each $2 75 net
Welcome.....each 2 75 net

Cartridges.
Metallic.....dis 50 @ 50&10 %
" Cards.—Horse and Curry.....dis 25&10 %
Cotton.....new list dis 10&10 %
Wool.....new list dis 10&10 %

Carpet Stretchers.
P. S. & W.....per doz $2 00; dis 33⅓ %

Cattle Leaders—Union Nut Co., new list.dis 50&10 %

Chain
English Coil.....net gold

₩ ℔	·13	9¾	9	8½	8¼	8c
	5-16	¼	5-16	⅜	7-16	½

Trace, 6½·10·2.....by the cask, ₩ pair, gold, 58c
Trace, 4·10·2.....by the cask, ₩ pair gold, 62c
Galvanized Pump Chain.....₩ ℔ 14c
German Halter Chain.....new list, Jan. 1, dis 15 %
German Coil.....new list, Jan. 1, dis 15 %
Jack Chain, Iron.....dis 50 %
" Brass.....dis 40 %

Chalk.
White.....₩ gross, 30c
Red.....₩ gross, 15c
Blue.....₩ gross, 50c
Crayons.....₩ gross, 14c

Cherry Stoners.
Family.....₩ doz $3·50

Chisels.
Socket Firmers.....dis 60&10 %
Socket Framing.....dis 60&10 %
Socket Corner.....dis 60&10 %
Tanged Firmers.....dis 40 to 40&10 %
Butcher's.....$5·50 to £ gold—new list
Newbould's.....$5·50 to £ gold
Spear & Jackson's.....$5·50 to £ gold—new list

Clamps.
Judd's.....dis 45&10 %
Lambert's.....dis 20 %
Providence Tool Co.....dis 10 %

Clips, Axle.
Norway or Best.....dis 30 %
Superior.....dis 50 %
"Star," Superior Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₩ doz, $ 85 @ 1 25
Wooden Handled.....₩ doz, 1 00 @ 2 00

Coal Hods.—Smith, Burns & Co.....dis 15 @ 25 %

	No. 15	16	17	18	Incn.
Japanned	$6·00	6·25	6·75	7·50	8·00	per doz.
Galvanized	9·50	10·00	10·75	11·50	12·50	"

Morning Glory Funnel Hods—

No.	15	16	17
Japanned	$9·00	10·50	12·00	per doz
Galvanized	13·00	14·50	16·00	"

Cockeves.
" No. 1.....dis 50 %
" " Hollow Augers.....dis 20 %

Cocks.
Brass Backing.....dis 25 %
Lock and Globe.....dis 25 %

Coffee Mills.
Board and Box.....dis 15 %
Increase Wilson's.....new list dis 15 %
Selsor's Pat.....$9·50, $10·50—dis 25 %
French Steel.....dis 15 %
The Swift.....dis 25 %
" American".....dis 20 %
Enterprise Mfg. Co.....dis 20 %
Diamond, per doz $1 00.....dis 10 %

Compasses and Dividers.
Bemis.....dis 35 %
Cook's.....dis 15 %
Excelsior.....dis 30 %
Peck Stow & Wilcox.....dis 25 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 20 @ 25 %
Swan & Brombacher.....dis 15 @ 20 %

Corkscrews......dis 25 %

Corn Knives and Cutters.
Bradley's.....dis 10 %

Croquet.—Phineas Smith.....dis 40&10

Crow Bars.
Cast Steel.....₩ ℔ 11c. net
Iron, steel points.....₩ ℔ 6½c

Crucibles.
Gautier & Co.....₩ No. 5½c

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass.....dis 20 %
Fitch's.....dis 15&10 %
Rubber.....₩ doz, $9·00—dis 15 %
Schweitzer Mfg. Co.....dis 20 %

Curtain Pins.
Silvered Glass.....old list dis 45&10 %

Cutlery.
American Table.....net list
American Pocket.....dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co...dis 20&10 %

Dog Collars.
Embossed Gilt.....dis 20 %
Leather.....dis 20 %

Door Springs.
Gray's.....$7·50 ₩ doz—dis 50 %
Torrey's Patent.....$7·50 ₩ doz—dis 50 %
Palmer's Japanned No. 6.....₩ doz $5·00
" Co ppered " ....." 6·00
" Silvered " ....." 8·00
Challenge.—
Japanned.....₩ doz $4 00 @ 6 00
Bronzed.....₩ doz 5 00 @ 7 00
Nickel Plated.....₩ doz 6 50 @ 9 00
1 Gross lots.....dis 10 %
5 Gross lots.....dis 20 %

Drawing Knives......dis 60 @ 60&10 %
Bradley's.....dis 25 %
Adjustable Handled.....dis 10 %

Drills.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %
Whitney's Ratchet.....dis 20 %
Blacksmiths'.....each $3 25 net

Drill Chucks.
The Danbury.....each 10·00—dis 25 @ 30 %

Drug Mills.
American Drug Mills.....dis 20 %

Egg Beaters.
Monroe's.....₩ doz net $8·25 @ 8·50
Dover.....₩ doz net $6·00
National.....₩ doz $4·50—dis 20 %
Peerless.....₩ doz $4·00—dis 10 %

Emery.
Genuine Chester—Regular Nos.....₩ ℔ 7c } dis 5 @ 10 %
" Flour and FF.....₩ ℔ 4c }
Washington Mills—Regular Nos.....₩ ℔ 8c
" Flour.....₩ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 35 %
Sauce Pans.....dis 25 %
Glue Kettles.....dis 20 %
Tinned Saucepans.....dis 25 %

Escutcheons.
Brass Thread.....dis 60&10 %
Wood.....dis 25 %

Faucets.
Cork Lined, Wood.....dis 60 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 10&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic " .....dis 40 %

Feiloe Plates......₩ ℔ 14c; dis 10 %

Files.
American File Co.....$5 00 to £ currency—dis 10 %
Nicholson.....$5 00 to £ currency—dis 10 %
Newbould's.....5 25 to £ gold
J. & Riley Carr's Files and Rasps.....5 50 to £ gold
Stubs'.....5 50 @ 6 00 to £ gold
Butcher's.....5 50 to £ gold
Walter Spencer & Co.'s "Diamond".....5 25 to £ gold
Spear & Jackson's.....5 00 to £ gold
Hargreaves, Smith & Co.'s.....5 00 to £ gold
Jowitt's.....5 25 to £ gold
"Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 00 to £ gold
R. Ibbotson.....5 00 to £ gold
Beam & Murray, "Cyclops".....4 85 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.).....5 00 to £ gold
" " Horse Rasps.....5 50 to £ gold
"Philo Sheffield," P. T. Co.....5 00 to £ gold

Floral Tools......dis 25 %

Fluting Machines.
Mrs. Coles, 7 inch rolls.....6 50
" " 6 " 5 50
Knox, with 4-inch Rolls.....5 00 each dis 10 %
" " 6 " .....6 00 each dis 10 %
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " " .....5 00 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 00 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4½-inch Roll.....5 50 each net
" 6-inch Roll.....6 00 each net
Myers' Fashion Fluter, 4½-inch Rolls.....3 00 each net
" Convex Brass Fluter, Sad Iron attachment..$1·75
Domestic Fluter.....$1·75 each net
Fairy, Self-Heater.....8 00 each net
Geneva Hand Fluter.....$15 00 per doz net
Champion, 6 inch rolls.....$6 00 each dis 10 %
" 4 inch rolls.....$5 00 each dis 10 %

Forges.
Keystone Portable Forge Co.'s.....dis 20 %
"Empire" (W. P. Kellogg & Co.).....dis 20 %

Forks.
Hay, Manure & Spading.....dis 30 %
Plated A 1.....dis 40&5 @ 50&5 %

Freezers.
Champion.....dis 33⅓
Torrey's.....dis 50 %

Fry Pans.—P. S. & W.
Tinned.....dis 25 %

₩ doz.	$3·00	3·25	3·62	4·00	4·50	5·00	5·50	6·00	7·50
No.	0	1	2	3	4	5	6	7	8

Smith, Burns & Co., "Excelsior" Polished.....dis 35 %

₩ doz.	$3·70	4·00	4·70	5·30	6·00	7·00	8·00	9·00
No.	1	2	3		5	6	7	8

Gas Stoves.
Tifft & Howard.....dis 20 %

Gauges.
Marking.....dis 45&10 %
Wire.....dis 10 %

Grind Stones.
J. F. Green & Bro.....dis 20 %

Grind Stone Fixtures.....dis 50 %

Hammers.
Emmet Hammer Co.....dis 25 %
Humason & Beckley Mfg. Co.....dis 16⅔&10 %
Maydole's, new list.....dis 5 %
Cheney's.....new list net
Verree.....dis 5 %
Yerks & Plumb.....new advanced list dis 10 %
Minot & Co.....dis 15 %
Magnetic Tack.....dis 2·&10 %
Warner's.....list net

Handles.
Hammer and Hatchet.....dis 10 %
Quakertown, Axe, Pick and Sledge.....dis 10 %
" Hammer and Hatchet.....net
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %
Brad Awl.....per gross $3 50.....dis 2·&10 %
Hickory Firmer Chisel, ass'td " 5 25—dis 10&10 %
" " " large " 6 25—dis 10&10 %
Apple " " ass'td " 6 00—dis 10&10 %
" " " large " 7 00—dis 10&10 %
Socket " " ass'td " 3 50—dis 10&10 %
" Framing " " " 6 00—dis 10&10 %
" " " " 3 50—dis 10&10 %
Auger " " " 5 50—dis 10&10 %
" " large " 6 50—dis 10&10 %

Hangers.
Barn Door.....revised list dis 60&10 %
"Anti-Friction" (Hider, Wooster & Co.).....dis 30 %
Novelty.....dis 30 %

Harness Snaps.
Henshaw's.....dis 25&10 %
Judd's.....dis 40 %
Fitch's.....dis 30 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....new list dis 50&10 %

Hatchets.—Isaiah Blood.....dis 10 %

Shingling, Nos. 1 2 3	₩ doz	$7 50	8 00	8 50
Claw, " 1 2 3	₩ doz	8 50	9 00	9 50
Lathing, " 1 2 3	₩ doz	7 50	8 00	8 50

Hunt's.....dis 10 %

Shingling, Nos. 1 2 3	₩ doz	$7 25	8 00	8 75
Claw, " 1 2 3	₩ doz	7 75	8 50	9 25
Lathing, " 1 2 3	₩ doz	7 50	8 25	9 00

Hurd's.....dis 10 %

Shingling, Nos. 1 2 3	₩ doz	$8 00	8 50	9 00
Claw, " 1 2 3	₩ doz	9 00	9 50	10 00
Lathing, " 1 2 3	₩ doz	8 00	8 50	9 00

Newark's Edge Tool Co.'s.....dis 25 %

Shingling, Nos. 1 2 3	₩ doz	$6 50	7 00	7 50
Claw, " 1 2 3	₩ doz	7 25	7 75	8 25
Lathing, " 1 2 3	₩ doz	6 50	7 00	7 50

Yerks & Plumb.....dis 10 %

Shingling, Nos. 1 2 3	₩ doz	$7 00	7 50	8 00
Claw, " 1 2 3	₩ doz	7 50	8 00	8 50
Lathing, " 1 2 3	₩ doz	7 00	7 50	8 00

Simmon's.....dis 15 %

Shingling, Nos. 0 1 2 3	₩ doz	$7 50	8 00	8 50	9 00
Claw, " 1 2 3	₩ doz		9 00	9 50	10 00
Lathing, " 1 2 3	₩ doz		8 00	8 50	9 00
Broad, " 1 2 3	₩ doz		9 00	10 00	12 00
" " 4 5 6	₩ doz		14 00	16 00	18 00
" " 7 8	₩ doz		20 00	22 00	

Elephant.....dis 25 %

Shingling, Nos. 1 2 3	₩ doz	$8 00	8 50	9 00
Claw, " 1 2 3	₩ doz	9 00	9 50	10 00
Lathing, " 1 2 3	₩ doz	8 00	8 50	9 00

J. P. Verree & Co.....dis 5 %

Shingling, Nos. 1 2 3	₩ doz	$7 00	7 50	8 00
Claw, " 1 2 3	₩ doz	7 50	8 00	8 50
Lathing, " 1 2 3	₩ doz	7 00	7 50	8 00

Underhill's.....dis 10 %

Shingling, Nos. 1 2 3	₩ doz	7 25	8 00	8 75
Claw, " 1 2 3	₩ doz	7 75	8 50	9 25
Lathing, " 1 2 3	₩ doz	12 00	11 00	13 00

Hinges.
Wrought Strap and T.....dis 20&10 %
Providence Plate. { 6 and 8 in. list 11c. } { over 8 in. list 9½c. } .....dis 20&5 %
Screw Hook and Strap..... { 8, 10, 12 in. 7½c } { 14 to 36 in .5½c } ....net
Heavy Welded Hook..... { 8 to 12 in.. 9c } { 14 in & up, 8½c } dis 10 %
{ ⅝ to 1 in., 9½c }
Screw Hook and Eye..... { ⅜ in. 10½c } .... net
{ ½ in. 12½c }

Hoes.
Solid Shank, C. S.....₩ doz $8 00—dis 30 %
Socket.....₩ doz 9 00—dis 30 %
Riveted Eye.....₩ doz 5 00—dis 30 %
Grub.....dis 20 %
Planters'—Winsted.....add 10 %
Scovill.....add ·33⅓ %
Scovill Pattern (Winsted).....add 20 %

Hooks.
Belt.....dis 50&10 %
Clothes Line.....dis 60&10 %
Bench—Skinner's.....per doz $8 00, dis 30 %
Bench—Hotchkiss' $5 00 ₩ doz.....dis 10 %
Bench—Weston's No. 1, $8·00; No. 2, $7·00 per doz net
—McGill's.....$3 00 per doz, dis 10 %
Wardrobe, Japanned.....new list dis 60&10 %
Hat and Coat " .....new list dis 60&10 %
Wrought Staples and Hooks and Staples.....dis 60, 10&10 %
Screw Hooks and Eyes, revised list.....dis 70&5 %
Grass.....dis 2 ·
Whiffletree—Patent.....dis 30 %
Hooks and Eyes—Malleable Iron.....dis 55 %
" " Brass.....dis 55 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Ausable Horse Nail Co.

No.	5	6	7	8	9	10
Ausable	30c	27c	25c	24c	23c	22c
Pointed and Polished	31c	28c	26c	25c	24c	23c
Pointed and Blued	32c	29c	27c	26c	25c	24c

In lots of 1000 lbs., 5% discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	22c	20c	20c	20c	20c	20c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs. dis 5 %.
Buffalo Forged.

No.	5	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished).

No.	5	6	7	8	9	10
Patent Finish	28	25	23	22	21	20
Extra "	30	27	25	24	23	22

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	32c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 7½ % discount.
New London Horse Nails.

No.	5	6	7	8	9	10
Great Western	27c	25c	24c	23c	22c
U B	29c	27c	26c	25c	24c

In lots of 1000 lbs., dis 5 %.
Star Brand.....₩ ℔ 16c
Morgan.....14c

Horse Shoes.
Burrowes.....₩ keg, $5 85
R. I. Horse Shoe Co., Perkins Pattern.....₩ keg, 5 85
" " R. I. Pattern.....₩ keg, 6 35
Mule Shoes.....₩ keg, 6 85

Ice Picks.
Iron.....₩ gross $12 00 @ $16 00 net
Dunlap's.....per doz $2 50 dis 10 %
W. H.....per doz 1 00 dis 10 %
Dunlap's.....per doz 8 00 net

Ironers.
Brass.....₩ ℔ 35c net
In lots of 500 lbs.....₩ ℔ 30c net

Knives.
Ames' Butcher Knives.....dis 20 %
" Shoe " .....dis 15 %
Hay and Straw, "Wadsworth's".....dis 20 %

Knobs.
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End.....reduced list dis 10&10 %

Ladles.
Melting.....dis 20 %

Lanterns.
Brady's Patent.....dis 10 %
Ætna.....dis 10 %
Yankee.....dis 10 %
De Beque.....dis 10 %

Lines.
Chalk.....dis 40 %
Galvanized Wire Clothes.....per doz 9 00 net

Locks and Latches.
Cabinet—Eagle.....dis 21 %
Cabinet—Gaylord.....dis 25 %
Trunk.....dis 10 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Scandinavian Jail.....dis 10 %
American Lock Co.....dis 33⅓ %
Plate.....dis 25 %
Pad.....new list dis 50, and 2 % for cash
Barnes & Deitz.....dis 25 %
Yale Lock Co.....dis 40 %
Sargent & Greenleaf.....dis 20 %
Trenton Lock Co.....
Branford.....
Norwich.....
Russell & Erwin.....
Norwalk.....
Nashua.....
Mallory, Wheeler & Co.....
P. & F. Corbin.....
Parker & Whipple.....
Jacobus & Nimick Mfg. Co.....
} New list dis 45 %. 2 % extra for cash.

Mallets.
Hickory and Lignumvitæ.....dis 10&10 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 10 %

No.	1	2	3	4
₩ doz.	$14 00	$17 00	$19 00	$20 00

Hales'.....dis 25 %

No.	11	12	13
₩ doz.	$37 00	$33 00	$42 00

Miles Challenge.....dis 20 %

No.	1	2	3
₩ doz.	$32·00	$30·00	$40 00

Perry's Champion (P. S. & W.).....dis 10 %

No.	300	300	400
₩ doz.	$22 00	$27 00	$40 00

Woodruff's (P. S. & W.).....dis 10 %

No.	100	150
₩ doz.	$15 00	$18 00

American.....dis 25 @ 25&5 %

No.	1	2	2½	3	4	5
Each	$6 00	$9 00	$14 00	$15 00	$30 00	$75 00

Molasses Gates.
Stebbins' Pattern.....dis 60&10 %
Tinned ends.....dis 40&10 %
Patent Self-Measuring.....per doz $42 00—dis 20 %
Bush's.....dis 20 %
Lincoln's.....dis 50&10 %

Mortars and Pestles.
Iron.....net

Mouse Traps.
Wood Choker.....₩ doz holes, 16 @ 18c
Round, Wire.....₩ doz $1 40 to 2 00 net
Square, " .....₩ doz 2 00 to 2 50 net
Cage, " .....₩ doz 2 50, dis 10 %

Mowers, Lawn.
Excelsior.....dis 25 %

Nails......10d $3 75 @ 3 90

Nail Pullers.
Capewell's Giant.....per doz $30 00 net

Nuts and Washers.
Nuts.....large, 6c; small, 8c off list.
Washers.....large, 8c; small, 10c off list.

Oil Stones.
Washita No. 1.....₩ ℔ 22c
Washita Slips.....₩ ℔ 45c
Washita No. 2.....₩ ℔ 11c
Arkansas.....₩ ℔ 1 25
Hindostan.....₩ ℔ 6c dis 10&10 %
" Slips.....₩ ℔ 10c dis 10&10 %

Oilers.
Olmsted's.....new list dis 25&10 %
Broughton's.....dis 25&5 %
Malleable.....per doz $5 00 dis 10 %
Common Tin.....dis 30 %
" Zinc.....dis 30 %
" Brass and Copper.....dis 30 %

Ox Shoes.
Concave.....₩ ℔ 13c net

Picture Nails and Knobs.
Richards' Patent.....dis 40 @ 40&10 %
Judd's.....dis 60&10 %

Pinking Irons......per doz $3 00—dis 60&10 %

Planes.
Auburn Tool Co.'s.....dis 30&10 %
Ensenore, Bench.....dis 50 %
Chapin s, 1st quality.....dis 25&10 %
Chapin's 2d quality.....dis 33⅓&10 %
Greenneld Tool Co.....dis 25&10 %
"New York".....dis 40 %
Sandusky Tool Co., 1st quality.....dis 35 %
" " 2d " (Ogontz).....dis 50 %
Ohio Tool Co., 1st quality.....dis 35 %
" " 2d quality (Sciota).....dis 30&10 %
Owasco Tool Co., 1st quality.....dis 30&10 %
" " 2d quality.....dis 50 %
Howland's, 1st quality.....dis
Bailey's Patent Adjustable.....dis 20&10 %
Plane Irons, Butcher's.....$5 50 to £ gold—new list
" Auburn Tool Co.'s.....dis 25 %
" Chapin's.....dis 10&10 %
" Greenfield Tool Co.....net list
" Ohio Tool Co.....dis 10 %
" Spear & Jackson's...5 50 to £ gold—new list
" Sandusky Tool Co.....dis 10 %
Plow Bits, Greenfield Tool Co.....dis 10 %

Pliers.
Button's Patent.....dis 33⅓ %

Plumbs and Levels.
Chapin's.....dis 66⅔&10 %
Standard Rule Co.'s New Adjustable.....dis 60&10 %
Standard Rule Co.'s Non-Adjusteble.....dis 60&10&10 %
Stanley Rule and Level Co.....dis 60&10&10 %

Pumps.
Douglass Cistern, etc.....new list dis 25 %
" S. & F.....new list dis 20 %
Union Mfg. Co's. Cistern and Pitcher.....dis 25 %
" " Rams.....dis 20 %
" " Garden Engines.....dis 10 %
Cucumber (Burlingham & Purdy)—
6 ft. No 3, with 12 ft. pipe.....$4·00 net
6 ft. No. 1, with 12 ft. pipe.....4·50 net
From 6 to 36 ft. add 20 cents per ft.
Pipe, 8c. per ft.; Coupling, 20c. per ft.

Rakes.
Cast Steel.....dis 30 %

$8 00	9 00	10 00	11 00
8	10	12	14 teeth.

Malleable.....dis 30 %

$5 00	5 50	6 00	6 50
9	11	13	15 teeth.

Razor Straps.
Evan's.....dis 25&10 %
Genuine Emerson.....dis 25 %
Hunt's.....dis 35 %
Chapman.....dis 10 @ 15 %
Torrey's.....dis 10 %
Saunder's.....net

Rivets.—Old Colony.
Iron and Tinned.....dis 25&7½ %
In bulk.....dis 7½ %
Copper Rivets and Burrs.....new list dis 25 %

Rods.
Stair.....new list dis 20 %
American Patent.....dis 30 %

Rollers.
Barn Door.....revised list dis 6 &10 %
Novelty.....dis 10 %

Rope. Manufacturers' List.
Manila.....½ inch and larger ₩ ℔ 16 c
" .....⅜ inch ₩ ℔ 16½c
" .....¼ and 5-16 inch ₩ ℔ 17 c
" Lath Yarn, Fine Tar'd.....₩ ℔ 17 c
" Hay Rope.....₩ ℔ 16½c
Sisal.....½ inch and larger ₩ ℔ 12½c
" .....⅜ inch ₩ ℔ 13 c
" .....¼ and 5-16 inch ₩ ℔

Lunch Boxes, per doz.....7 in $2·00; 8 in. $2 50; dis 10 %
Pepper Boxes Japanned.....dis 10 %
Per gross.....Small, $3·00; Large, $4·00
Toy Banks, House.....dis 0 %
Tea Trays, American Tea Tray Co.....dis 15 %
No.....1 2
Per gross.....$7·00 5·50
Toy Banks Gothic.....dis 10 %
No.....1
Per gross.....$5·50
Toy Cups, Straight.....dis 10 %
No.....1 2 3
Per gross.....$4·00 3·50 3·50
Toy Cups, Flaring...No. 1, $4·25; 2, $3·70 ₩ gross, dis 10 %
Toy Pails, Covered.....dis 10 %
No.....1
Per gross.....$4·30
Toy Rattles.....per gross, $2·25, dis 10 %
Trunks, Wire Handled.....per nest (5) $1·50, dis 10 %
Spittoons, Tin....per gross. No. 2, $30. No. 3, $27, dis 10 %

PLANISHED TIN WARE.

Planished Coffee Pots, Round.....dis 25 @ 30 %
Each..... ·00 ·75 ·85 ·95 1·15 1·25 1·30 1·40
Pints..... 1 2 3 4 5 6 7 8
Planished Tea Pots, Round.....dis 25 @ 30 %
Each..... ·70 ·80 ·95 1·05 1·25
Pints..... 2 3 4 5 6
Planished Tea Pots, Oval.....dis 25 @ 30 %
Each..... ·70 ·80 ·90 1·05 1·15 1·40 1·75
Pints..... 1 2 3 4 5 6 8
Planished Pepper Boxes, No. 1.....per doz., $1·52
Planished Flour Dredges, No. 3, $2·10; 4, 2·45 ₩ dozen.
Planished Round Coffee Biggins.....dis 25 %
Pints..... 2 3 4 5 6 8
Each..... $1·00 1·10 1·20 1·40 1·60 2·00
Planished Oval Coffee Biggins.....dis 25 %
Pints..... 2 3 4 5 6 8
Each..... $1·15 1·25 1·40 1·60 1·80 2·25
Planished Oval Chafing Dishes, Imperial Covers...dis 25 %
Inch..... 10 12 14 16 18 20 22 24
Each..... $3·85 5·00 6·25 7·60 9·00 11·50 15·00 16·50
Planished Oval Chafing Dishes, Low Covers.....dis 25 %
Inch..... 10 12 14 16 18 20
Each..... $3·25 4·35 5·20 6·20 7·80 9·25
Planished Low Dish Covers.....dis 25 %
Inch..... 10 11 12 14 16 18 20
Each....$ ·70 ·80 1·00 1·25 1·50 2·00 2·75
Planished Imperial Dish Covers.....dis 25 %
Inch..... 10 11 12 14 16 18 20 22 24
Each....$1·55 1·70 2·00 2·60 3·15 3·45 4·60 5·45 6·30
Planished Etnas, on Stands.....dis 25 %
Pints..... 1½ 3 3 4 5
Each.....$0·90 1·00 1·20 1·50 1·75
Planished Liquor Mixers.....dis 25 %
Nos.....0 1 2
Per doz.....$2·00 2·10 2·45
Planished Oval Melon Molds.....dis 25 %
Nos..... 2 3 4 5 6 7 8 9
Each.....$·60 ·65 ·70 ·80 ·90 1·00 1·15 1·35
Planished Oval Tumbler Warmers.....dis 25 %
To fit 1, 2, 3, and 4 O. G. Urns.....each, $2·50
Planished Oval O. G. Urns.....dis 25
Nos..... 1 2 3 4 5 6 7 8
Each.....$4·90 5·45 6·30 7·00 7·75 9·25 11·25 12·50 15·50
Planished Round Urns.....dis 25 %
Nos..... 0 1 2 3 4 5 6 7
Each.....$4·20 4·85 5·45 6·30 7·75 9·00 11·00 14·25
Planished Round Oyster Dishes, (Complete).....dis 25 %
Nos.....1 2
Each.....$2·10 2·80
Planished Oyster Dish Plates.....dis 25 %
Nos.....1 2
Each.....$0·25 0·30
Oyster Dish Covers.....dis 25 %
Nos.....1 2
Each.....$0·30 0·35

Tea Pot Handles—P. S. & W.....dis 20 %

Stow's Patent Hollow Tea Pot Handles.

No. 1, Small 4½ inches.....per gross, $11·50
No. 2, Medium, 5¾ " ..... " 12·50
No. 3, Large, 6½ " ..... " 13·50
No. 4, Ex. Large, 7¼ in., for Wash Pitchers, &c..... " 18·00

Stow's Patent. New Pattern.

No. 25, Small, 4½ inches.....per gross, $11·50
No. 35, Medium, 5¾ " ..... " 12·00
No. 45, Large, 6½ " ..... " 13·00

Solid Iron, Tin Tipped.

No. 10, Small, 4¾ inches.....per gross, $9·00
No. 15, Medium, 5½ " ..... " 9·50
No. 20, Large, 6¾ " ..... " 10·75

Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.
No. 12, Bronzed and Tin-Tipped.....per gross, $13·50

Saucepan Handles. Of Best Malleable Iron.
P. S. & W.....dis 20 %

Japanned.

No. 1, 5½ inches long.....per gross, $3·50
No. 2, 6 " ..... " 3·75
No. 3, 6½ " ..... " 4·00
No. 4, 7¾ " ..... " 4·25
No. 5, 8 " ..... " 4·50
No. 6, 9 " ..... " 4·75

Tinned.

No. 1, 5½ inches long.....per gross, $4·25
No. 2, 6 " ..... " 4·50
No. 3, 6½ " ..... " 4·75
No. 4, 7¾ " ..... " 5·25
No. 5, 8 " ..... " 5·50
No. 6, 9 " ..... " 5·75
Japanned.....per lb., ·16
Tinned..... " ·20

METALS.

IRON.—DUTY: Bars, 1 to 1¼ cents per lb.. Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb

Pig Iron—AMERICAN.

Foundry No. 1.....₩ ton, $30 00 @ 32 00
Foundry No. 2..... " 28 00 @ 30 00
Gray Forge..... " 25 00 @ 28 00
White and Mottled.....

SCOTCH.

Coltness..... " 40 00
Glengarnock..... " 35 00
Eglinton..... " 33 00 @ 33 50
Summerlee.....

Bar Iron.
Am. Refined, at mill.....₩ lb 3c

Rails.
Welsh, gold.....₩ ton, 48 00 @ 50 00
American, at works, currency..... " 56 00 @ 58 00
Old Rails, currency..... " 34 00 @ 35 00

Scrap.
Wrought Scrap, from yard..... " 33 00 @ 37 00

Bar Iron from Store.

Common Iron.
¾ to 2 in. round and square.....₩ ton, $ 65 00
Refined Iron.
¾ to 2 in. round and square..... " 67 50

Sheet Iron.

	Common English.	R. G. American.	R. G. English.
Nos. 10 to 20.....₩ lb	4¾ @ 4¾c	5¾c	6c
21 to 24..... "	4¾ @ 5c	6c	6c
25 to 26..... "	5 @ 5¼c	6c	6c
27..... "	5¼ @ 5¾c	6¼c	6¼c
28..... "	5¾c	6¼c	6¾c

Galvanized, 1 to 20, prime, ₩ lb 10; 2d quality...₩ lb 9c
" 21 to 24 " " 11 " " 10c
" 25 to 26 " " 12 " " 11c
" 27 " " 13 " " 12c
" 28 " " 14 " " 13c
Patent Polished..... " 15 @ 16c
Russia, Nos. 8 to 16.....₩ lb 18c
" Stained, No. 1..... " 17c
Belgian..... " 12c

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

¾	5	5¾	6	7 inch.
$2·50	3·50	4·50	5·25	6·50 per doz.

RUSSIA IRON.

5	5¼	6	7 inch.
7·00	9·50	12·00	14·00 per doz.

BABBITT METAL.

Excelsior.....cash, dis 10 %
No..... 1 2 3 Extra.
10c 12c 15c 20c @ 25c

Brass.

ROLLED AND IN SHEETS.
(Brown & Sharp's Gauge.*)
For the purchase of 100 pounds and over at one time

HIGH BRASS.

All Nos. to No. 28, and widths 14 in. and under.....34c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive.....35c
Over 20 in. to 30 in. inclusive.....40c
½c ₩ lb advance on each No. above No. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass at.....53c
Sheets 24x48 in., and all sheets cut to particular sizes and lengths.....40c
Platers' Rules.....44c
Sheets wider than 30 in. and under 40 in.....44c
" 40 in. and over.....46c
Circular sheets, in diam. from 4 in. to 14 inclusive....41c
" " " over 14 in. to 20 " 42c
" " " " 20 in. to 30 " 50c
" " " " 30 in. to 40 " 54c
" " " " 40 in.....56c
Brass Rods above No. 0, and under 1 in.....43c
" " 1 in. and over.....47c

LOW BRASS.

4c ₩ lb more than High Brass.
Gilding Metals, 7c ₩ lb more than High Brass.
Platers' or Gold Metal } in Bars..... 46c
" } Sawed..... 49c

FOR SLITTING: Metal in Width.
In. to ¼ in., to No. 30, inclusive, 1c ₩ lb advance.
In. to 1 in., thinner than No. 30, 2c ₩ lb advance.
2 in. to ¼ in., " " 30, 3c " "
⅜ in and less to No. 30, 3c ₩ lb advance.
⅜ in. and less thinner than No. 30, 5c ₩ lb advance.
10 % discount.

SCRAP—NEW METAL.

High Brass Scrap, 14 cents, net.
Low " 12 " "
Gilding, 21 cents, net.
Turnings, Filings and Chips, half the price of Scrap net

BRASS AND COPPER WIRE
(Stub's Wire Gauge).

	High Brass.	Low Brass.	Gild'g and Cop'r
Nos 0 to 20.....	37	41	47
Nos. 21, 22, 23.....	38	42	48
Nos. 24 and 25.....	39	43	49

Brass Wire straightened and cut, 4 cents advance.
10 % discount

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gild'g and Cop'r
No. 26.....	0·41	0·45	0·51
No. 27.....	0·44	0·48	0·54
No. 28.....	0·46	0·50	0·56
No. 29.....	0·48	0·52	0·58
No. 30.....	0·50	0·54	0·62
No. 31.....	0·52	0·56	0·66
No. 32.....	0·56	0·60	0·71
No. 33.....	0·60	0·64	0·81
No. 34.....	0·64	0·68	0·91
No. 35.....	0·69	0·73	1·03
No. 36.....	0·78	0·82	1·15
No. 37.....	0·94	0·89	1·28
No. 38.....	1·28	1·28	1·28

Ten cents per pound extra for Spooling.

TUBING
(Brown & Sharpe's Gauge.)

₩ lb
Plain to No. 20, inclusive.....$0·52
Nos. 21, 22, 23, 2c. advance on List for each No.
Nos. 24, 25, 26, 4c. " " "
Above No. 26 special rates.
Plain Tube, 1-4 inch.....68
" 3-16 " 1 53
" 1-8 " 1 78
All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20 61
Tubing sawed or cut 2 to 4 ft. long, 2c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet. 10 % discount.
BRASS DOOR RAIL—48 cents per lb.—10 % dis.
BELT AND HOSE COPPER RIVETS AND BURS., dis. 25 %.

Price per lb.....49 50 52 54 56 58 60 64 68c
Nos.....7 8 9 10 11 12 13 14 15

Braziers Rivets, 48 cents per pound discount 10 %.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent. 12 inch. to No. 26.....	·0·75	0·90
6 " " "	0·85	1·00
10 " " "	1·05	1·25
15 " " "	1·30	1·55
18 " " "	1·45	1·75
20 " " "	1·55	

Discount 10 %.
German Silver Sheets over 12 inches wide and weighing more than 10 lbs.....$2·10 ₩ lb net
Advance 50 cents for each additional inch in width above 12 inches, and two cents per pound on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers' at 50 cents per pound additional.
German Silver Scrap, one-third less than net price of 12 inch Market Metal; German Silver Turnings, Filings and Chips, half the price of Scrap.
* Brown & Sharp's Gauge is about two numbers finer than Stubs' Wire Gauge.

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ lb; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.
American Ingot.....₩ lb 25 @ 26½c
English " "

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot.....35c ₩ lb
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....38c. "
Braziers Copper, 12 oz. per square foot and lighter.41c. "
Circles less than 24 inch in diameter.....38c. ₩ lb
Circles, 24 inch diameter and over.....41c. "
Segment and Pattern Sheets.....38c. "
Locomotive Fire Box Sheets.....35c. "
Sheathing Copper, over 12 oz. per sq. ft.....33c. "
" " 12 oz. ₩ sq. ft. and lighter... 41c. "
Bolt Copper.....35c. "
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case.....8c. ₩ sheet
14x48, less than case.....10c. "
Boiler Sizes, 7 and 8 inch.....12c. "
" 9 inch.....15c. "
Other sizes not larger than 30x60.....2½c. ₩ sq.
Larger than 30x60..... 5c. "
Copper Bottoms.34 @ 36c. ₩ lb.....net

O'NEILL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier.....39c. By the case, 38c. ₩ lb
12 oz. and lighter..... 42c. " " 41c. "

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier.....41c. By the case, 40c. ₩ lb
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier.....43c. ₩ lb
12 oz..... 46c. "

LEAD—DUTY: Pig, $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2¼ cents per lb. All subject to a reduction of 10 per cent.

Spanish.....6¼ @ 6¾c gold
German Refined.....6¼ @ 6¾c gold
English.....6½ @ 7c gold
American.....5·75 @ 5·80 gold
Bar.....dis 20 %.....5¾c.
Pipe.....dis 20 %.....9c.
Tin Lined Pipe.....dis 10 %.....16½c.
Sheet.....dis 10 @ 20 %.....9c.
Shot.....dis 20 %. Drop, 9c.; Buck., 9½c.
Solder.....No. 1, 15 @ 15½c; No. 2, 13½ @ 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool.....15 @ 16c
Spring.....10c
Homogeneous.....12½c
Tire.....12½ @ 13½c
Machinery (round and square).....10 @ 11c
File.....11c
Sheet.....14c
Saw Plate, mill and inlay.....14 @ 16½c
Saw Plate, gang and X cut.....13 @ 14c
" circular as to size.....18 @ 30c

Chrome Steel.

Tool.....₩ lb 20 @ 21c
Tool, extra fine..... " 40 @ 75c
Spring.....₩ lb 12c and upward
Machinery.....₩ lb 14c.
Hammer..... " 15c,
Gun or Homogeneous..... " 16c

English Steel.—payable in gold, dis 5 % cash.

Best Cast.....₩ lb 18c
Extra Cast..... " 19c
Round Machinery, Cast..... " 11½c
Swaged, Cast..... " 18c
Best Double Shear..... " 18c
Blister, 1st quality..... " 13½c
" 2d quality..... " 11½c
" 3d quality..... " 10½c
German Steel, Best..... " 11½c
do 2d quality..... " 10½c
Sheet Cast Steel, 1st quality..... " 18c
" " 2d quality..... " 16c
" " 3d quality..... " 14c
File Steel, Flat and ½ Round..... " 12½c
" Square and Round..... " 13c
" Mill..... " 13½c
" Taper to 4 inch..... " 14c
" Taper 3 and 3½ inch..... " 18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.
Silesian, cash.....6¾ @ 7c., gold
American " .....7¾ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per lb; Manufactures of, not enumerated, 35 per cent. ad val. —all subject to a reduction of 10 per cent. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca.....₩ lb 26c., gold
Straits.....₩ lb 24c., gold
English.....₩ lb 21½ @ 23c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal.....11·50
12x12, " .....12·00
14x20, " .....12·25
I X 10x14, " .....13·75
12x12, " .....14·25
14x20, " .....14·75
D C 12½x17 " .....11·00
D X 12½x17 " .....13·25
For each additional X add.....2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14..	$10·50 @ 11·00	9·50 @ 10·00	9·00 @ 9·50
I C 12x12.....	11·00	10·50	
I C 14x20....	11·25	10·50	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20....	$10·50	9·75 @ 10·25	8·00 @ 9·00
I X 14x20....	12·75		
I C 20x28.....	21·00 @ 22·00	20·00 @ 21·00	17·00 @ 19·50
I X 20x28	26 00		
I C 20x24 0 ft.	27·00		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet, 2¼c. ₩ lb. All subject to a reduction of 10 per cent.
Sheet.....cask 9¼c
" .....open 9¾c

Paper Stock, Old Metals, &c.

(*Dealers' Selling Prices.*)

Canvas linen.....6¼ @
" cotton. No. 1..... @ 7
" " No. 2..... @ 5
White linen rags. No. 1.....6¾ @ 7
" " No. 2.....4¾ @ 5
Colored.....2½ @
Mixed woolens..... @ 2½
Soft woolens..... @ 5½
Gunny bagging.....1¾ @ 2
Jute Butts.....2¼ @ 2¾
Kentucky bagging.....5¾ @ 5¾
Book stock.....4 @ 4½
Waste paper and scraps.....1 @ 1½
Rope cuttings.....1½ @ 3
Kentucky Bale rope.....4 @ 4½
Oakum junk, No. 1.....5½ @ 5¾
" No. 2..... @ 4
Grass rope.....3¾ @ 4
Tarred Shaking.....1½ @
White Collar Cuttings, all paper..... @
" " muslin lined..... @
" Envelope " ..... @
Hard White Shavings, No. 1..... @
Soft " No. 1..... @
White Shavings, No. 2..... @
Mixed Shavings, part white..... @
Imperfections, No. 2, best folded sheets..... @
" " 1, Heavy Stock..... @
Book Stock, Mixed.....3½ @
" " No. 2, light..... @
Prints..... @
Pure Manilas..... @
Bogus Manilas and Hardwares..... @
Commons..... @
Binders' Board Cuttings..... @
Straw Board Cuttings..... @

Old Metal.

Copper..... @ 19
Yellow metal..... 14 @ 15
Brass..... 13 @ 14
Heavy Composition..... 17 @ 18
Old lead, solid..... 6 @ 6½
Tea lead..... 4½
Wrought iron..... 1½ @ 1⅝
Sheet iron..... 0¾ @
Cast iron..... 1 @ 1¼
Machinery iron..... 1¼ @ 1½
Zinc..... 5
Pewter, No. 1..... 17
" No. 2..... 10 @ 12
Spelter..... 5½ @ 6

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters.....₩ lb 30c
" " Ordinary..... 9c
" Ivory Drop, fair..... 15c
" " best..... 26c
Black Paint, in oil.....kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best.....50 @ 75c
" " " in oil..... 35 @ 85c
" Chinese, dry..... 85c
" Ultamarine..... 25 @ 30c
Brown, Spanish..... 1¼c
" Van Dyke..... 9c
Carmine, 40..... $12 00
Green, Chrome..... 15 @ 25c
" in oil..... 18 @ 25c
" Paris.....good, 30c; best, 40c
" " in oil..... " 30c " 45c
Mineral Paints..... 1¼ @ 4c
Orange Mineral..... 14½c
Red Lead, American..... 9¼c
" English..... 10½c
" Venetian (N. C.) dry..... 2¾c
" " in oil.....asst'd cans, 11c; kegs, 8½c
" Indian, dry..... 10c
Rose Pink..... 13c
Sienna, American, Raw..... 4c
" Burnt..... 4½c
" " in oil..... 16 @ 20c
" Raw " ..... 15 @ 25c
Umber, Burnt..... 4 @ 8c
" " in oil..... 16 @ 21c
" Raw..... 3½ @ 7½c
" " in oil..... 16 @ 22c
Vermillion, Chinese..... $1 92
" English..... 1 90
" Trieste..... 1 65
" American, Common.....22c
White Lead, American, pure dry.....10½c
" " in oil.....11½c
White, Paris, English, prime.....in bbls. 2¾ @ 2¾c
Yellow Ochre, French..... 2½ @ 2¾c
" " in oil.....asst'd cans, 11c; kegs, 8½c
" " Vermont.....in casks 1¼c
" Chrome..... 17 @ 21c
" in oil..... 18 @ 28c
Zinc White, American No. 1 dry..... 9c
" " 1, in oil..... 11c
" French (Paris)..... 11 c
" " in oil..... 12 c

Oils.

Linseed Raw.....₩ gal. casks, 85c. bbls. 88c
" Boiled..... " 91c. " 93c
Whale, Crude..... "
" Bleached Winter..... "
Sperm, Crude..... " 1·80
" Winter unbleached..... " 1·85
" " bleached..... " 1·90
Seal, Extra Refined..... "
Lard, Pure Winter..... "
" Spring..... " 1·00
Cotton Seed, Crude..... " 60c
" Southern Yellow..... " 65c
" White..... "
Neatsfoot, Winter.....70c @ $1·10
Natural Lubricating.....38c @ 40c

Sundries.

Asphaltum..... 9c
Benzine.....₩ gal. 16c
Chalk..... 1¾c
" Block.....
Dryer, Patent, Am'n.....asst'd cans, 10½c.; kegs 9c
" English..... " 11c " 9c
Flocks.....
Frostings..... 50c
Glue, White..... 33 @ 47c
" Sheet..... 20c
Glaziers' Points, Zinc..... 9c
Gum, Copal..... 80c
" Damar..... 25c
" Shellac, English..... 60c
" " " dark..... 50c
Litharge..... 10c
Pumice Stone, selected Lumps..... 4 @ 6c
" powdered..... 1c
Putty in bladders..... 3½c
" in bulk..... 3c
Rotton Stone, soft, English..... 5c
Spirits Turpentine..... 38c
Whiting, Spanish..... 1c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	
6 x 8 to 10 x 15.....	$10·25	$9·25	$8·75	$8·00
11 x 14 to 16 x 24.....	12·00	11·00	10·00	9·50
18 x 22 to 20 x 30.....	15·00	13·50	12·00	10·50
15 x 36 to 24 x 30.....	17·50	15·25	12·50	
26 x 24 to 24 x 36.....	18·25	16·00	13·25	
26 x 36 to 26 x 44.....	20·00	18·00	14·50	
26 x 46 to 30 x 50.....	21·00	19·00	15·25	
30 x 52 to 30 x 54.....	22·50	20·25	16·25	
30 x 56 to 34 x 56.....	24·50	21·75	19·00	
34 x 58 to 34 x 60.....	26·00	24·50	21·50	
36 x 60 to 40 x 60.....	30·50	27·00	24·50	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15.....	$16·50	$15·00	$14·00	$13·00
11 x 14 to 16 x 24.....	19·25	17·75	16·00	15·25
18 x 22 to 20 x 30.....	24·00	21·75	19·25	
15 x 36 to 24 x 30.....	25·00	24·50	20·00	
26 x 28 to 24 x 36.....	29·25	25·75	21·25	
26 x 36 to 26 x 44.....	32·00	29·00	23·25	
26 x 46 to 30 x 50.....	35·75	30·50	24·50	
30 x 52 to 30 x 54.....	36·00	32·50	26·00	
30 x 56 to 34 x 56.....	39·25	35·00	30·50	
34 x 58 to 34 x 60.....	41·75	39·25	34·25	
36 x 60 to 40 x 60.....	49·00	43·25	39·25	

Sizes above—$12·00 per box extra for every 5 inches.
An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 80 united inches, will be charged in the 81 united inches bracket.
Discount 60@10 @ 60@15 %.

A. C. Downing & Comp'y,

Wm. C. Stuart. Francis Dougherty.

Importers of and Dealers in

Window Glass,

FRENCH PICTURE

And Car Glass, etc.

Estimates given by mail.

57 Beekman & 87 Ann Sts, NEW YORK.

H. CARTER,

290 PEARL ST., NEW YORK.

Moulders' and Plasterers' Tools.

Manufacturers of and Dealers in all descriptions of Moulders' and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes, CARTERS' PATENT CARRIAGE LIFTING JACK, &c.

Hardware.

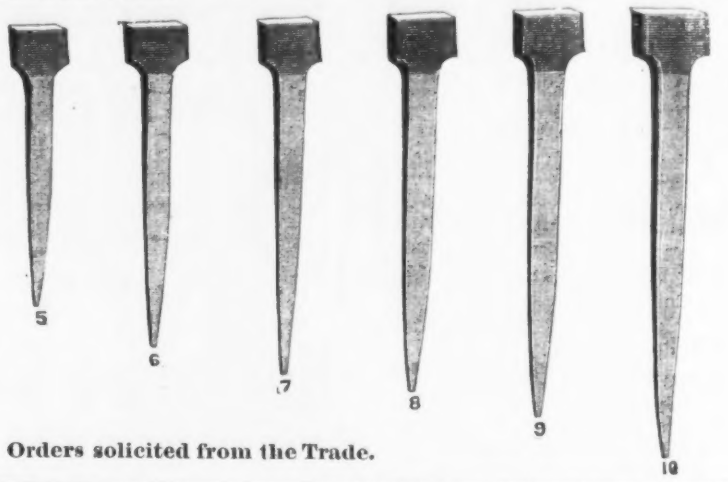
PRATT & CO.,

Hardware & Iron Merchants, Buffalo, N. Y.

Manufacturers of the Superior Brand,

BUFFALO FORGED HORSE NAILS.

These Nails are superior, being made with new and improved machinery and actually hammered from the best brands of Norway Iron.



Orders solicited from the Trade.

GEORGE B. WALBRIDGE,

99 Chambers Street, New York,

MANUFACTURER OF

ALWAYS COOL STOVE LID LIFTERS,

WITH VENTILATED HANDLE.

This Lifter is cast in one piece, with an open lattice-work handle, through which a current of air passes, thus constantly cooling the metal.
The Lifter is light, handsomely finished and very suitable.

ALSO, REPRESENTS:

PRATT & CO.,
Nuts, Washers, Crow Bars, Horse Nails, &c.
SHELTON CO.,
Tacks, Carriage, Tire and Stove Bolts, &c.
SYRACUSE BOLT WORKS,
Norway Iron, Philadelphia Carriage Bolts.
WOOLWORTH HANDLE W'KS,
Axe, Pick, and Sledge Handles, &c.
CHALLENGE
Augers & Bits, Union Bolts, & Spoke Shaves.
DERBY SILVER CO.,
Fine Plated Spoons, Forks and Ladles.
H. T. MILLER,
Hatchets and Edge Tools.
D. H. GOODELL,
Lightning and Turn Table Apple Parers, &c.
ELEPHANT
Edge Tools, Axes, Handles and Tools.
SIDNEY SHEPARD & CO.,
French Stamped and Japanned Tinware.
NATIONAL HORSE NAIL CO.,
Polished and Finished Horse Nails.
BLAIR & WHERLEY,
Brad Awl Sets.

Philadelphia Forging Works.

MANUFACTURERS OF

Wrought Iron Carriage & Wagon Hardware,

AND ALL DESCRIPTIONS OF

Steel & Iron Drop Forgings.

OFFICE AND WORKS:

1203, 1205 & 1207 East Thompson St. above Cumberland, PHILADELPHIA.

The Improved Champion Ice Cream Freezer of 1874.

Is in all respects THE BEST IN THE MARKET.

[Patented, July 9, 1872.
TWELVE SIZES.]

Geared.

No.	Quart.
20	3
21	4
22	6
23	8
24	10
25	12
26	16
27	20

Fly Wheel.

No.	Quart
28	16
29	20
30	40

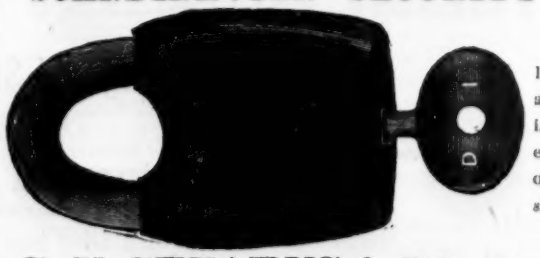
Gang Freezers.

No. 31, two 20 quart together.

Please send for Circulars and Price Lists.

Sole Manufacturers, SIDNEY SHEPARD & CO., Buffalo, N. Y.
GEO. B. WALBRIDGE, Agent, 99 Chambers St., N. Y.

"SCANDINAVIAN SECURITY PAD LOCKS."



The best and handsomest locks in the market. The Case and Cap are made of malleable iron, and the shackle case hardened. Prices lower than on any other lock *with shoulder on shackle upon the market.*

G. N. STEARNS & CO., Syracuse, N. Y.
New York Agents, HUBBARD & CURTISS MFG. CO., 82 Chambers St.

Grindstones, Emery, &c.

Walter R. Wood,

GRINDSTONES

283 FRONT STREET,

NEW YORK.

EMERY WHEELS AND MACHINERY

Upon which to run the same, of all kinds.

EMERY Emery Cloth, Mill Stone CEMENT. TRADE MARK. DIAMOND Tools, Oil Stones,

Soapstone Register Borders.

For particulars, address,

UNION STONE CO.,

6 Exchange and 26 Devonshire Streets, Boston, Mass.

THE TANITE COMPANY

Emery Wheels TANITE Emery Grinders

STROUDSBURG MONROE Co. PA.

WILLIAMS WHITE & CHURCHILL,

Successors to

MACKRELL & RICHARDSON MFG. COMPANY,

Manufacturers of

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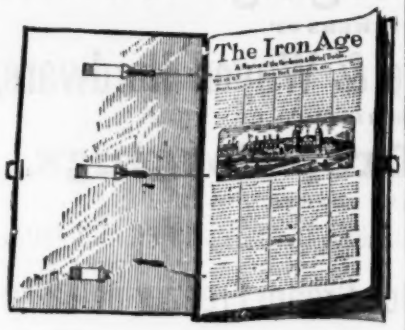
Locks, Hinges, Hooks and Staples,
Awning Hooks, Meat Hooks, Pincers,
Champion Noiseless Pulleys,
CHAIN PULLEYS, &c.

Factory, cor. Flushing and Nostrand Avenues
BROOKLYN.
Warehouse, 73 Warren St., N. Y.

Get Binders

FOR THE IRON AGE.



We have made arrangements to furnish Kochi's PATENT BINDER, which we think altogether the best before the public, to our subscribers at the following very low rates—about the wholesale prices by the dozen.

Half Cloth.....**$1·00 each.**
(Cloth Back and Corners, with Morocco Paper Sides—a good, serviceable Binder.)

Full Cloth..... 1·50
(Morocco Cloth Back and Sides.)

Half Roan..... 1·75 "
(Roan Back; Cloth Sides.)

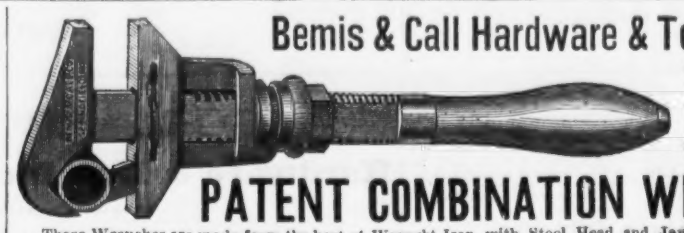
Half Morocco..... 2·00 "
(Morocco Back and Corners; Cloth Sides.)

The above are all in black, which is the most serviceable color, with the exception of the Half Morocco, which are put up in a number of handsome shades. The name of the paper is stamped in gold on either side, and each Binder is furnished with loops by which it can be hung up against the wall as newspaper files are usually disposed of.

The Binders will each hold the twenty-six numbers in the form of a bound volume. They can be nicely inserted in two or three minutes by any boy of ordinary intelligence; and when the covers are full they can be either preserved in that shape as bound volumes of *The Iron Age*, or they can be emptied and used again. There is no possibility of their getting out of order, unless the cords, which are very strong, wear out, when anyone can easily replace them with a piece of fishing line or other suitable string. Subscribers who value the paper should order them at once, so as to keep the paper in good order

On receipt of the price we will ship them, safely put up, by any express line or to any New York house to be packed. They are too large to be sent by mail.

Bemis & Call Hardware & Tool Co.'s



This Wrench can be furnished with Brigg's Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Hardened throughout. And not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench. Thus making a Combination which has no equal.

For Circulars and Price List, Address,

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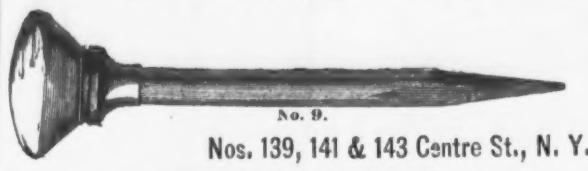
MARKT & CO.,



Nos. 139, 141 & 143 Centre St., N. Y.

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Hardware Specialties,

DOOR KNOBS (Lava, Wooden, Porcelain & Mineral), SHUTTER, PICTURE AND DRAWER KNOBS,

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BRIGHT WIRE GOODS,

Alarm Whistles and Mouthpieces,

FURNITURE NAILS,

Bright Halter & Coil Chains, French Wire Nails,

Wrought Iron and Brass Butts.

Having consignment of one of the largest German manufacturers of **Halter and Coil Chains**, we can offer inducements on these goods.

We shall be pleased to send our new lists and prices to those who will apply.

L. COES & CO.,

Manufacturers of

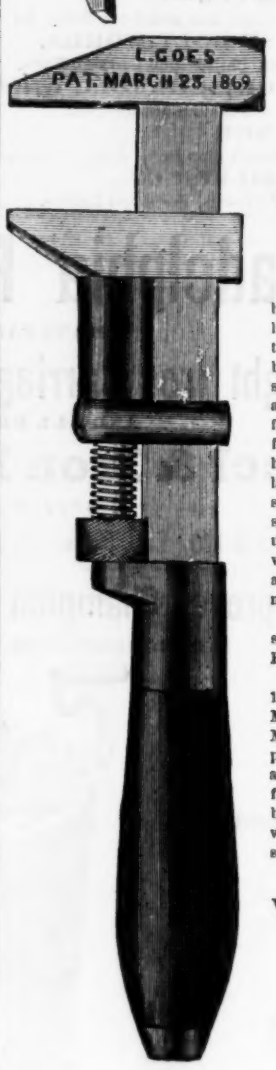
L. COES' Genuine Improved

PATENT

SCREW

WRENCHES,

Worcester, Mass.



Our Mr. L. Coes, formerly senior member of the firm of L. & A. G. Coes, established in 1839, is the Original Inventor of the Screw Wrench, and has, by making the bar *wider*, where th strain comes most severe, and screwing a nut up firmly against four *square* shoulders inside the ferrule, thereby *effectually* preventing the ferrule from being thrust back into the handle or getting loose, and making a larger screw than in the old wrench, fully succeeded in making a 12 inch wrench stronger than a 15 inch made in the usual manner. All sizes are made in this way, and are undoubtedly the strongest and best finished Screw Wrenches in the market.

There ar *Imitations* of our goods offered for sale, that, without question, infringe on our Patents.

We hold Patents bearing date Nov. 10th, 1863 (re-issued June 1st, 1869), June 26th 1866, March 23d, 1869 (re-issued April 12th, 1870, and May 14th, 1872), which fully cover all our improvements. One of the above cuts represents a sectional view, showing the nut under the ferrule, and the strengthened bar, that part being covered by the saw, as seen in the cut of wrench complete. None genuine unless stamped

"L. COES & CO"

Warehouse, 97 Chambers and 81 Reade Streets, New York.

HORACE DURRIE & CO., Agents.

NEW ENGLAND AGENTS.

HOGAN, CLARKE & SLEEPER,

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Coal **Hods.**

Stamped Corrugated Sheet Iron Bottom Riveted.

We manufacture six styles having our patent corrugated bottom, and all having the body bottom and hoop **riveted** together. Dealers before buying will find it to their advantage to get our prices, and also to beware of a **seamed** hod that is in the market, somewhat similar in shape to ours. Don't buy any but the **Corrugated Riveted Bottom Hod,** manufactured by

SMITH, BURNS & CO., 46 Cliff St., N. Y.

Also Manufacturers of

Galvanized and Japanned Sheet Iron Goods, and Plain, Stamped and Japanned

TIN WARE.

FRY PANS, FIRE SHOVELS, ASH SIFTERS, &c. Send for Catalogue.

White Lead, &c.

John T. Lewis & Bros.,

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JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD. PHILADA.

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The Atlantic White Lead and Linseed Oil Company,

MANUFACTURERS OF

White Lead (Atlantic), Red Lead Litharge & Linseed Oil.

ROBERT COLGATE & CO.,

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Established 1782.

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BROOKLYN WHITE LEAD CO., INCORPORATED 1865
SUPERIOR PURITY, DURABILITY AND COLOR
COPYRIGHT SECURED.
OLD STANDARD BRAND.
ADDITIONAL TRADE MARK.
We caution consumers against the numerous spurious brands, in imitation of ours, of adulterated and greatly inferior qualities—which are sold as our LEAD.
$50 Reward for detection of counterfeits.
BROOKLYN WHITE LEAD COMPANY PREMIUM LEAD WARRANTED PURE
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White Lead, Red Lead and Litharge.

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JOHN JEWETT & SONS

Manufacturers of the well known Brand of

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JEWETT & SONS' PERFECTLY PURE WHITE LEAD.

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Also Manufacturers of

LINSEED OIL

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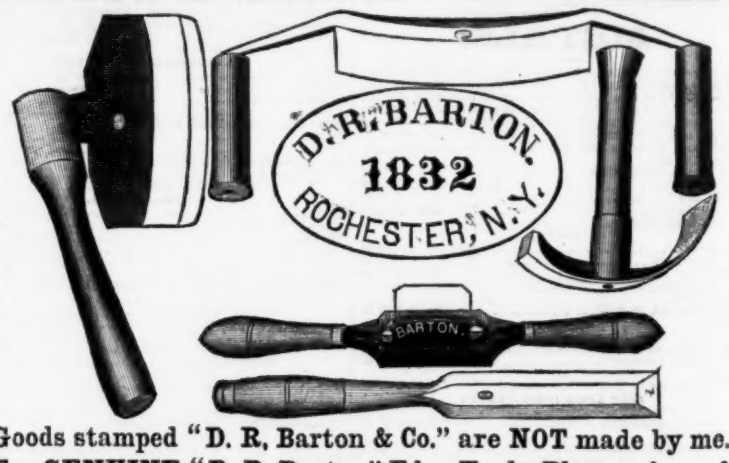

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Goods stamped "D. R. Barton & Co." are NOT made by me.

For GENUINE "D. R. Barton" Edge Tools, Planes, Axes, &c., be sure to address D. R. BARTON, and NOT D. R. Barton & Co.

Factory and Office, Mill Street, cor. of Furnace.

D. R. BARTON, Rochester, N. Y.

Iron & Brass Wood Screws.

Full assortment constantly on hand.

ALFRED FIELD & CO.,

Importers,

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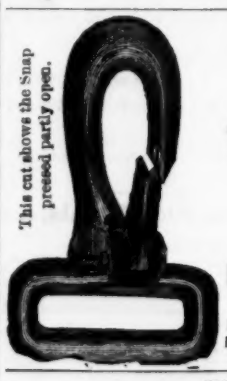

This cut shows the Snap pressed partly open.

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The Celebrated "Baldwin" Plane Iron,

HENSHAW'S PATENT HARNESS SNAPS

GERMAN HARNESS SNAPS,

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Plow, Fillettster & Dado Stops of all kinds, Set Screws for Plows, Bench Plane Starts, &c. Patent Washer Cutters. Plane Iron Screws to order of any size.

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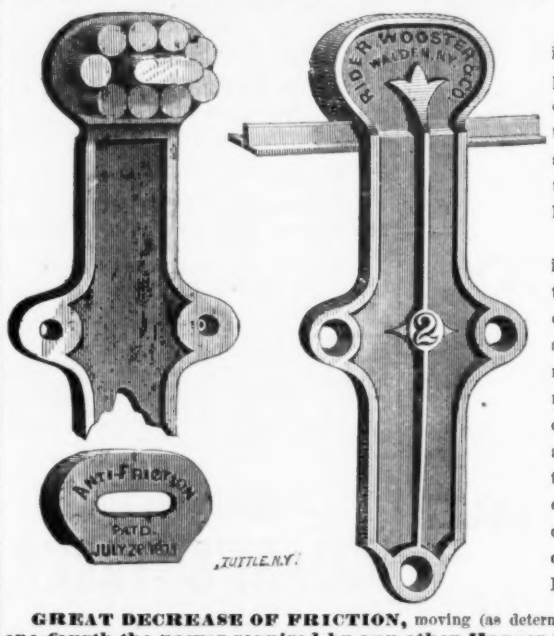
Wostenholm's IXL Pocket Knives & Razors, Butcher's Files, Tools, &c.

No. 93 Chambers Street, NEW YORK.

Anti-Friction Barn Door Hanger



This Hanger is entirely new in principle and design, and possesses marked advantages over all others, entirely obviating all the defects and annoyances hitherto experienced in the use of ordinary sheaved hangers.

In construction it is exceedingly simple, as will be seen by the cut. The weight of the door is supported by a strong stud, between which and the rail is a series of chilled iron rollers, inclosed by the front of the hanger and cap, and as these rollers pass under the stud, they are returned over it in succession. There is consequently no friction, except that of rolling surfaces. Its leading advantages are:

GREAT DECREASE OF FRICTION, moving (as determined by direct experiment) with **one-fourth the power required by any other Hanger in the world.**
Great Strength. Unlimited Durability.
No Axles and Sheaves to grind and break.
All bearing surfaces harder than steel.
Thorough protection from the weather.
It will not clog with snow and ice.
It cannot run off the track.
It causes the door to run perfectly true.
It cannot get out of order.
It is compact, Simple and Beautiful in design.

This Hanger will fit any ordinary rail, but our rail is preferable, from the fact that it has a double flange at the bottom, so that the screws will not work out and allow it to rock or tip over.

No. 1 Hanger, corresponding to 4, 5 and 6 in. Sheaves or Rollers.....per pair, $1·25
No. 2 " " 6 inch and upward..... " 1·50
One Dozen Pairs in each case.—dis 30 per cent.
RAIL, with Double Flange.....per foot, 7 cents.
200 *feet in each case.*—dis 30 per cent.

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Manufactured by the

PENNSYLVANIA CORUNDUM COMPANY.

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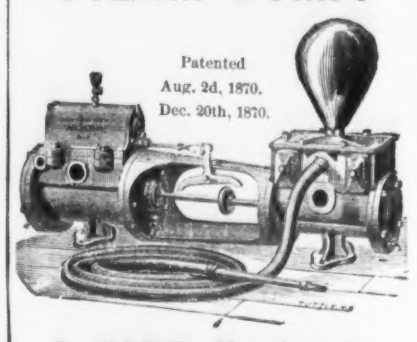
The Selden Direct-Acting STEAM PUMP.



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Combining simplicity and durability to a remarkable degree. Its parts are easy of access, and it is adapted to ALL PURPOSES for which Steam Pumps are used.

It is Unsurpassed as a Mining Pump.

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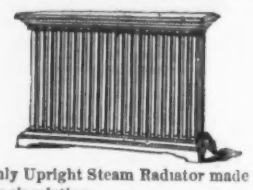
CIRCULATING
Steam Radiator.



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Selden Steam Pump, Wrought & Cast Iron Pipe, Brass Work, &c.,

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CONTINENTAL LOCKS,

Made of Wrought Iron or Brass, very superior quality, and only an auger used in mortising.

SCHWEITZER PAD LOCKS,
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WITH

STUBS' STEEL POINTS,

Best and Cheapest Goods in the market. Sole Agents for the United States for

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We also make a superior

AXE. *"Queen of the Forest,"* *"Wood Chopper's Pride,"* &c

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General dealers in

FOREIGN & DOMESTIC HARDWARE.

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FOR ILLUS. CATALOGUE.

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20 SIZES

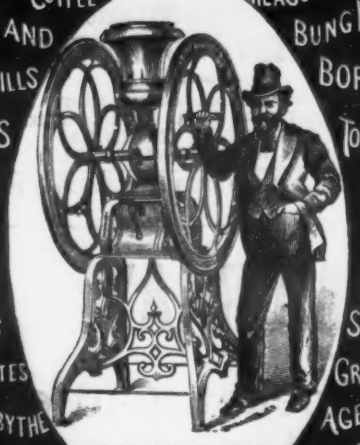
MEASURING FAUCETS BUNG HOLE BORERS

TOBACCO CUTTERS

FOR SALE BY THE HARDWARE TRADE

CHEESE KNIVES MOLASES GATES

MADE BY THE ENTERPRISE MFG CO



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SAW SETS &c &c.

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GRAHAM & HAINES, Sole Agents, 88 Chambers Street, N. Y.

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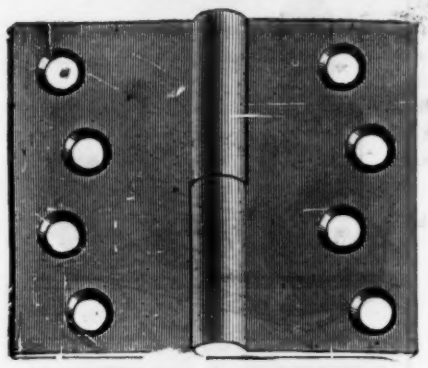
PROVIDENCE, R. I., Manufacturers of

Cast Butt Hinges,



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SMALL CASTINGS

Made to order.

Headquarters for

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Hand, Mill, Circular and Cross Cut.

ALSO,

Plumbs and Levels, Try Squares, Gauges, Trowels and Barker's Reversible Butt.

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Hemp Piston Packing

FOR

Locomotives, Steamships, Stationary Engines, Hot or Cold Water Pumps.

Recommended by Master Mechanics and Engineers, as the cheapest and best in market. **No more Extortionate Prices. No more Fluted Rods**—but a good article at fair price.

JOHN CANFIELD & CO.,

SOLE MANUFACTURERS,

Office, 1321 Fairmount Ave., Phila.

PATENT APPLIED FOR. Send for Circular.

BAEDER, ADAMSON & CO.,

Manufacturers of

Sand and Emery Paper and Emery Cloth

(Also, in Rolls for machine work.)

GROUND EMERY, CORUNDUM AND FLINT,

Glue & Curled Hair, Cow Hide Whips.

STORES:

PHILADELPHIA, 730 Market St., | BOSTON, 143 Milk St.,

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COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Glimp Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order

NEW YORK AGENCY

Grundy & Kenworthy

HARDWARE.

165 Greenwich Street.

Agent for the Philadelphia Star Carriage and Tire Bolts

SAMUEL LORING'S

PLYMOUTH TACK AND RIVET WORKS

PLYMOUTH, MASS., manufacturer of

TACKS, BRADS, NAILS AND

RIVETS.

Swedes and Common Iron Tacks; Leathered, Carpet Brush, Lace and Gimp Tacks; Finishing, Hungarian, 2d, 2d and 3d Fine, Trunk, Clout, and Cigar Box Nails; Black and Tinned Trunk Nails; Zinc, Iron, Copper and Steel Shoe Nails; Brads and Patent Brads; Glaziers' Points, &c., &c., &c. COPPER, BRASS AND IRON RIVETS, of all kinds. Coopers' Rivets, from 1d to 6d, in casks of 100 lbs. each. Hose, Belt and Shoe Rivets and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS

Established in 1810.

HOBART'S TACKS.

Manufactured by

Dunbar, Hobart & Whidden,

Office and Salesroom,

116 Chambers Street, N. Y.

Factory, SOUTH ABINGTON, MASS.

Manufacturers of

American, Swedes and Copper Tacks, Tinned, Leathered and Large Head Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners', Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points, Iron, Steel, Copper, Zinc and Brass Shoe Nails, HEEL and TOE PLATES, STEEL SHANKS, and FANCY HEAD NAILS, SILVER or JAPANNED LINING and SADDLE NAILS.

A full assortment always on hand at salesrooms, for immediate delivery if required.

Odd and irregular sizes made to order or cut from sample at short notice. Send for Price List.

Schweitzer Mfg. Co.,

57 Reade St., N. Y.

IMPORTERS & JOBBERS.

WE OFFER

5000 CASES

OF

Pail Handles

PACKED

500 in a Case

AT

80cts a Case.

TIFFT & HOWARD, NEW YORK.

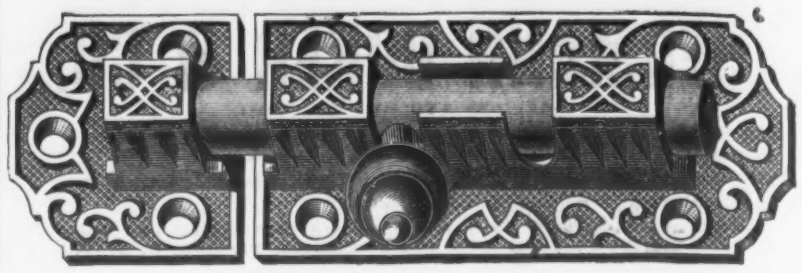
The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS OF

BUILDERS' HARDWARE,



Japanned, Brass, Plated, Enameled and Bronze Metal Door Bolts,

Cupboard Catches, Sash Fasteners,

Drawer Pulls, Store Door Handles, &c., in great variety.

Send for our Catalogue and Appendix. Price $4·50, and charge remitted on receipt of subsequent orders.

THE CELEBRATED

YALE LOCKS

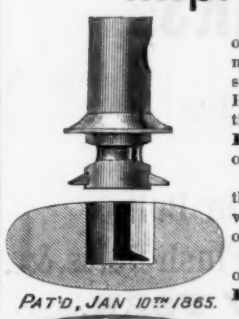
FOR ALL USES.

ORNAMENTAL REAL BRONZE HARDWARE.

Yale Lock Manufacturing Co., Stamford, Conn.

Salesroom, No. 298 Broadway, NEW YORK.

Improved Door Knobs.



On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st., page 11, for illustrated description of our patent **Telescope Locks and Latches**, with patent Flat Steel **Perforated Keys,**

Address

BRANFORD LOCK WORKS,

Branford, Conn.

Or, THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,

18 & 20 Cliff and 243 & 245 Pearl Streets, New York

Easily Applied and not Liable to get out of Order."—From Report of Judges at American Institute Fair, 1872.

The Challenge Door Spring Co.,

Patented. Exclusive Manufacturers of the [March . 1873

In Appearance the Most Beautiful. In Action the Most Graceful. In Use the Most Reliable.

The Challenge Springs are manufactured from **Steel Wire, tempered by an Improved Process,** the result of repeated experiments, and must not be classed by dealers with the numerous worthless "Coil Springs" made from common Bed Spring Wire.

No. 49 Ann Street, NEW YORK.

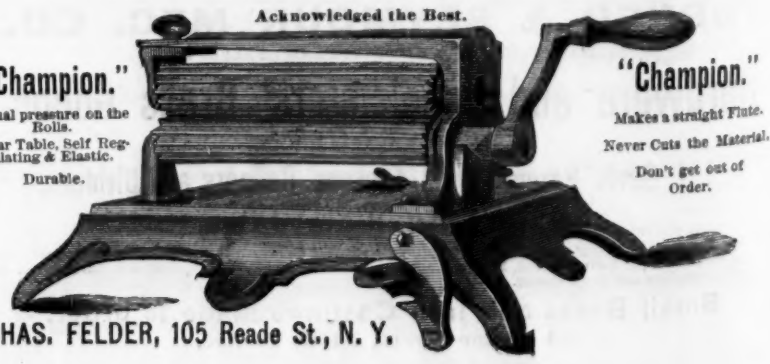
Acknowledged the Best.

"Champion."

Equal pressure on the Rolls.

Clear Table, Self Regulating & Elastic.

Durable.



"Champion."

Makes a straight Flute.

Never Cuts the Material.

Don't get out of Order.

CHAS. FELDER, 105 Reade St., N. Y.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel.....₱ lb 14c
Peter Wright's.....₱ lb, gold, 12½c
Wilkinson's.....11½c
Eagle.....11 cents currency—dis 15 @ 15&5 %
Apple Parers.—Union.....per doz $8 00
Skeleton.....“ 8 00
Victor, Improved.....“ 8 00
Reading “.....“ 8 25
Turn Table. “.....“ 8 50
Bay State Paring, Coring and Slicing.....“ 12 00
Discount for 25 dozen lots.....50c
Axes.—Mann's Light.....Per doz. $13 00 @ 12 50
Hunt's Light.....“ 13 00 @ 12 50
Red Indian, all sizes.....“ 12 50 @ 12 00
Red Chieftain, all sizes.....“ 13 00 @ 12 50
Crown Prince.....“ 18 50 @ 13 00
Augers and Auger Bits.—Pierce's Pat. Twist Bits.....dis 25 @ 30 %
Douglass' & Ives' Bits.....dis 30&10 %
Connecticut Valley Auger Bits.....dis 35&10 %
Cook's Bits.....dis 40&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 30&5 %
Douglass' & Ives' Augers.....dis 30&10 %
Watrous' Ship Augers.....dis 10 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearn's Patent Hollow Augers.....dis 25 %
Balances.—Landers Frary & Clark's.....dis 15 %
Chattillon's.....dis 15 %
Morton's.....dis 15 %
Common Spring with Hook.....₱ doz $1 38 @ 2 00
Bells.—Bevin Bros. Mfg Co. Light Hand Bells.....dis 60&10 %
Other makers light.....dis 65&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50 %
Great Western and Kentucky Cow.....dis 50&10 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 15 @ 20 %
Douglas' Mfg. Co., complete with augers..dis 15 @ 20 %
Common Boring Machines, no Augers.....¾ 25 @ 4 00
Angular. “ “ 5 25 @ 5 00
Bolts.—Eastern Carriage Bolts.....special prices
Western “ “ “
Philadelphia “ “.....dis 50 @ 50&5 %
Wrought Snutter Bolts.....dis 50 %
Cast “ “.....dis 50 %
Skelly's Phila. Norway iron. finish. points.....dis 50 %
Braces.—Barber s.....dis 45&5 %
Backus.....dis 45 @ 50 %
Bartholomew's American Ball.....dis 10&10 %
Spofford.....dis 40 @ 40&5 %
Butts.—Cast Fast Joint, Narrow.....dis 40 @ 40&5 %
“ “ Broad.....dis 50 @ 50&5 %
Cast Fast Loose Joint.....dis 50 @ 50&5 %
“ Acorn, Loose Pin.....dis 40&10 %
Wrought Loose Pin.....dis 35 %
“ Table Hinges and Back Flaps.....dis 30 %
“ Narrow.....dis 30 %
“ Loose Joint.....dis 35 %
“ Reversible.....dis 35 %
Parker's Bung Butts.....
Shepard's “ “.....} dis 50 %—dis by the
Clark's “ “.....} case 50&5 %
Cherrytree “ “ for wood. }
Lull & Porter's “.....dis 40 %
Clark's Mortise Butts.....dis 40 %
Chains.—German Halter.....dis 15 @ 20 %
“ Coil.....dis 15 @ 20 %
Galvanized Pump.....₱ lb 15c
Best Proof Coil Chain—

₱ lb...	12½	10¾	10	9½	9¼	9	8¾c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 560 lbs., discount ½c per lb. Common Chain, ½c per lb. less than proof.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang “.....dis 40 @ 40&10 %
Beaty's Framing and Firmer.....dis 10 @ 15 %
Casters.—Porcelain Wheel.....dis 30&10&5 %
Iron.....dis 30&10 %
Brass.....dis 30&10 %
Clothes Wringers.—Universal.....per doz $68 00
Novelty.....“ 68 00
Reliance.....“ 68 00
Providence.....“
Monitor.....“ 68 00
Orders for 5 dozen, discount $1 per doz.
King Wringers (Iron Frame).....per doz $68 00
Coffee Mills.—Common Box and Side.....dis 10 @ 15 %
Patent Box and Side.....dis 10 @ 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.'s ..dis 60 @ 60&10 %
Concave Adjustable Handle.....dis 10 %
Beatty.....dis 10 @ 15 %
Fry Pans.
Tinned.....dis 30 %

₱ doz..	$3 00	3 25	3 62	4 00	4 50	5 00	5 50	6 00	7 50
No....	0	1	2	3	4	5	6	7	8

Burnished.

₱ doz..	$2 80	3 00	3 38	3 75	4 13	4 50	5 00	5 62	6 25
No....	0	1	2	3	4	5	6	7	8

Files.
Nicholson Mill Files.... new list, $5 00 to £ cur dis 10 %
“ Bastard..... “ 5 00 to £ cur dis 10 %
“ Taper..... “ 5 00 to £ cur dis 10 %
Butcher's Mill.....$5 75 to £ gold
“ Bastard.....5 50 to £ gold
“ Taper.....5 50 to £ gold
Moss & Gamble—Mill, Taper and Bastard.....5 50 @ 5 25 to £ gold
Fluting Machines.
K. F. M.—4¼ in. rolls, $5 50.....dis 10 %
“ —6 in. rolls, $6 65.....dis 10 %
Mrs Knox—4 in. rolls, $5 50.....dis 10 %
“ —6 in. rolls, 6 65.....dis 10 %
Hammers.
Yerkes & Plumb's.....dis 10 %
Hammond & Son's.....dis 10 %
Veree.....dis 10 %
Hatchets.
Beatty's.....dis 10 @ 15 %
Shingling and Half. { ₱ doz.. $7 00 7 50 7 75 8 00
{ No..... 4 5 6
Yerkes & Plumb.....dis 10 %
Shingling and Half. { ₱ doz.. $7 00 7 50 8 00 8 50
{ No..... 1 2 3 4
Claw.... { ₱ doz..... $7 50 8 00
{ No..... 1 2 3
Hinges.—Strap and T.....dis 25&10 %
Bonney's No. 1 Gate.....dis 25 %
“ No. 2 and 3.....dis 35 %

Horse Nails.	Nos.	6	7	8	9	10
Ausable		27	25	24	23	22
Globe		28	26	25	24	23
Brundage		26	24	23	22	21
	Nos.	5	6	7	8	9
Putnam		32	28	26	25	24

Ou Ausable, Globe and Brundage 1000 ₱ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.....dis 45 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks.

₱ doz.....	$10 50	10 50	12 00	12 00	13 00	15 00	dis 15 %
No.....	9	9½	10	10½	11	11½	
₱ doz.....	$18 00		18 00		20 00	22 00	dis 15 %
No.....	12		12½		13	13½	

Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
“ Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincoln's “.....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 10 %
Woodruff.....dis 10 %
Stowe.....dis 10 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
Planes.—Auburn Tool Co., “Bench”.. dis 35 @ 35&5 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Plumbs and Levels.
Stanley Rule and Level Co.....dis 60&10 %
Wm. Johnson, (Stanley List).....dis 60&10 %
Rakes.—Cast Steel Garden.....dis 33⅓ %
Malleable Garden.....dis 33⅓ %
Wood Head Iron Teeth.....dis 30 @ 40 %
Rules.—Stanley Rule and Level Co.....dis 60 @ 60&10 %
Steven's and Hubbard's.....dis 60 @ 60&10 %
Steelyards.—American Pattern.....dis 15 %

₱ doz.....	$5 50	7 00	9 00	11 00	11 00	12 00
No.....	50	100	150	200	250	300

English Pattern.....dis 15 %

₱ doz.....	$7 00	8 67	10 67	12 67	14 67	16 67
No.....	50	100	150	200	250	300

L. F. & C. Excelsior.....dis 10 %

₱ doz.....	$9 00	10 00	12 00	15 00	18 00	21 00
No.....	50	100	150	200	250	300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₱ doz. $11 00 net
Clipper No. 10, Boxed and Sharpened.....₱ doz $10 00
“ 5, “ “ 10 00
Common Scythes.....₱ doz $7 00 @ 10 00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 12½ %
Disston's Hand.....dis 12½ %
W. McNiece's H'd, Cross-Cut & Circ'r, new list.dis 15 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb. 1873.....dis 20&10 %
“ “ Back Strap “.....dis 20&10 %
Oliver Ames & Sons.....new list dis 12½ %
Brady Shovel Co.....dis 12½&5 %
Sad Irons.—Richmond (polished face).per lb. 4¼c. net
Coquanock (polished face)..... “ 4 c. net
Steng.—Arkansas Oil, No. 1.....₱ lb $1 75
Turkey Oil, No. 1.....“ 1 00
Washita Extra.....“ 30c
“ No. 1.....“ 22c
“ “ 2.....“ 18c
“.....“ 5½c

Screws.—Iron.....new list, Jan. 1st, 1874, dis 52½ %
Brass.....dis 5&½ %
Spoons.—
Plated Spoons, Rogers Bros.'.....dis 40 %
Britannia Spoons.....dis 40 @ 40&10 %
German Silver.....new list dis 10 @ 15 %
“ Light.....new list dis 15&5 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 40 %
Torry's Door.....dis 40 %
Stocks and Dies......dis 15 %
Stove Polish.—Gem.....₱ gross, $5 00
Onyx.....“ $5 00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
“ “ by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
“ “ by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation “ “.....dis 30 %
Vises.—Solid Box.....₱ lb net 15c
Wrenches.—Coes Genuine.....dis 40 %
Coes Imitation Wrought Bar.....dis 50 %
“ “ Malleable Bar.....dis 60 %
“ “ (Kellogg) Malleable Bar.....dis 30 @ 10 %
Tafts Pattern (Wrought Bar).....65 %
“ “ Kellogg's (Nail Bar).....dis 65&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
“ “ “ Improved Baxter.....dis 25 %
“ “ “ Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....dis 37½ @ 40 %
No. 19 to 26.....dis 40 @ 42½ %
No. 27 to 36.....dis 45 @ 47½ %
Coppered o to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 20 %
Galvanized Wire No. 0 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

July 25, 1874.

Augers—Snell Mfg. Co.....dis 20 %
Bits, Auger—Snell Mfg. Co.....dis 20 %
Bells, Cow—Shaw's Genuine.....dis 25 %
Bolts—Carriage and Tire.....dis 70&20 %
Braces—Bit, Spofford's Patent.....dis 40 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 25 %
Cast Loose Joint.....dis 60 %
“ “ Pin.....dis 45 %
“ “ “ Japanned.....dis 45 %
“ “ “ Silver Tipped.....dis 25 %
Wrought Narrow.....dis 30 %
“ Broad, Loose Joint.....dis 35 %
“ Table and Back Flaps.....dis 30 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 35 %
Leather new list.....dis 30 @ 30&5 %
Beaters, Egg, “Peerless”.....per doz $4 00
Brick—Bath (box of 2 doz) Best English.....$1 50
“ Rutherford”.....$1 00
Chalk—White, Carpenter's.....₱ gross, 50c
Red, Carpenter's.....“ 75c
Blue, “.....“ 90c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable.....₱ lb 10½c
Cherry Seeders.....per doz $12 00
Clothes Wringers, “Novelty” No. 2.....₱ doz $62 00
Elbows—Corrugated.....

	5	5½	6	7	
Charcoal	$3 50	4 50	5 25	6 50	dis 10 %
Russia	7 00	9 50	12 00	14 00	

Files—Maischoss Bros.....dis 50 %
Freezers Ice Cream—“Champion.....dis 33⅓ %
Hammers—Henry W. Kip's.....dis 7½ %
Hinges—Window Blind—
Clark's.....dis 50&5 %
Shepard's and Standard.....dis 50&5 %
Wrought Strap and T.....dis 20&10 %
Hods, Coal—Plain, Black and Galvanized.....dis 10 %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Palace Coal Vases.....dis 10 %
Hooks and Staples—Wrought.....dis 60&10 %
Hooks—Belt.....dis 50 %
Hasps and Staples—Wrought.....dis 60&10 %
Sad Irons.....4c
Kettles—Brass.....₱ lb .50 @ 51c
Enameled.....dis 50 %
Knives, Drawing—Oval No. 1.....dis 60&10 %
Razor Blade.....dis 50&10 %
Lanterns “Peerless,”....No. 1 5 10

	₱ doz	$30 00	$11 25	$13 75	dis 10 %
Gem, with guards..					$6 50
Tubular, “ “					11 00

Machines—Apple Paring, “Turn Table”.....$8 50 ₱ doz
Mills, Coffee—Box and Slide, common.....dis 10 %
Box Union and Eagle.....dis 10 %
“American.....dis 20 %
Nails—Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10

	30	27	25	24	23	22c
“ “	Finished & Pointed.....					add 1c ₱ lb
“ “	1000 lbs.....					dis 5 %
“ Clinton.....	No.	5	6	7	8	9 10
		22	20	19	18	17c

Packing—Rubber.....dis 30 @ 35 %
Pencils, Slate—Soapstone.....

	4	5	6in.
	30	40	50c. ₱ 100

Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₱ lb 9 c
Rivets—Iron, Black and Tinned.....dis 25 %
Copper.....dis 10 %
Rope—Manila, ¾ inch and larger.....₱ lb 15½c
Rules—Boxwood and Ivory, Stephens.....dis 60 %
Screws—“American Screw Co”—
Flat Head, Iron.....dis 52½ %
Flat Head, Brass.....dis 52½ %
Staples—Blind, Boardman's Pat., ¾ & ⅝.....₱ lb 37c
Spoons, Iron Tinned.....dis 10 %
“ by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 40 %
Britannia.....dis 40 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₱ keg $6 00
Shovels & Spades—Shepard, Forsyth & Dennison..dis 20 %
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Shears—Seymour's.....dis 60 %
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Asm. Iron.....dis 12½&7½ %
Vises—Parallel, Buffalo.....dis 20 %
Wrenches—Coes' genuine.....dis 40 %
Coes' Imitation.....dis 50&10 %
Tafts' Pattern.....dis 65&10 %
Ware—French, Tinned and Iron.....dis 25 %
Stamped and Japanned.....dis 10 %
Cast Iron Hollow.....dis 33⅓ %
Tin Plates.—Add for each X.....2 00
10x14, IC, Charcoal...$12 00 | 14x20 C. terne.....$10 75
12x12, “ ... 12 50 | 20x28 C. “ ... 21 75
12½x17, “ ... 11 50 | 20x28 X. “ ... 27 25
14x20, “ ... 13 00
Pig Tin—Straits.....30c @ 31c
Bar Tin.....32c
Solder.....No. 1, 17c; No. 2, 16c
Sheet Zinc—
“Lasalle”.....$70 | 100 ₱ casks
$10 00 | 10 50 ₱ 100 ₱s
Sheet.....$10 00
Iron Wire—Bright and Annealed.....dis 37½ %
Coppered.....dis 32½ %
Tinned.....dis 15 %

Tinned Broom,	Nos. 20	21	22	} dis 20 %
	20c	21c	21c	

Copper—Sheathing 14 @ 18 oz.....₱ lb 33c
Planished.....₱ lb 39 @ 41c
Bottoms.....₱ lb 34c
Bolts.....₱ lb 35c
Braziers' Sheets.....₱ lb 37c
Sheet Iron.—
18 Common.....$5 00
24 Common.....5 00
24 W. D. Wood & Co., Smooth Finish.....6 10

Am. Russia.....	A.	B.
	15c	12½c
Gen. Russia, No. 1 stained.....		15c
“ “ clean.....		20c
Galvanized.....		dis 15 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$ @ 13 00
I. X. 10x14 Charcoal.....@ 17 00
I. C. Terne 14x20.....11 00 @ 12 00
I. C. Terne 20x28.....24 00 @ 26 00
I. C. Continuous.....26 00
Block Tin.....₱ lb 30c @ 31c
Solder.—S. & Co.....₱ lb 26c
Lead.—Pig.....₱ lb 7c.
Copper.—Ingot.....₱ lb @ 36c
Planished.....“ @ 44c
Sheathing.....“ @ 35c
Copper Drops @ 35c
Zinc. Cast, 500 to 1000 lbs.....₱ lb 10 c
Case, 100 lbs.....“ 11 c
Slab.....“ 7½c
Brass.—Roll, No. 6 to 20.....₱ lb 38c
“ 20 to 30.....“ 40c
Roll, No. 30 to 40.....₱ lb 40c
“ 40 to 45.....“ 45c
Wire, No. 0 to 20.....₱ lb 40c
“ 20 to 25.....“ 45c
Babbit Metal.—Sellew & Co.....₱ lb 35c
Allens'.....₱ lb 23c
Market.....“ 12c
Antimony.....₱ lb 17c
Bismuth.....₱ lb $4 00
Nickel.....₱ lb $4 50

Sheet Iron.—

Gem Russia.....₱ lb 22c	Am Russia A.....₱ lb 15c
	“ “ B..... “ 12½c

	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'fd.
15 to 20	4·4c	5·5c	7·9
22 to 24	4·8c	6·1c	8·1c
26	4·8c	6·3c	8·3c
27	5·0c	6·5c	8·5c

Galvanized Iron.—Full bundles.....dis 20 %

Nos. 18 to 20	12c	No. 26	14c
22 to 24	13c	27	15c

Bar Steel.—Silver, ₱ lb 16c; Crescent, 21c.
Iron Wire.....dis 33 %
Enameled Ware.....dis 45 %
One Piece Corrugated Elbows......dis 10 %

Charcoal Iron.		Russia Iron.	
4¼ inch.....	₱ doz $2 50	4¼ inch.....	₱ doz $5 00
5 “	“ 5 50	5 “	“ 7 00
5½ “	“ 4 50	5½ “	“ 9 50
6 “	“ 5 25	6 “	“ 12 00
7 “	“ 6 50	7 “	“ 14 00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

₱ doz.		₱ doz
2-inch.....$1 75	2½-inch.....	$2 75
3-inch..... 2 25	3½-inch.....	3 25
4-inch..... 2 50	4½-inch.....	3 50

Sheet Iron Bread Pans.....₱ ⅋ 10 %
American Broilers.....₱ doz. $2 00
Tinmen's Machines.....dis 5 %
Sad Irons.....₱ lb, 4 c
Brass Kettles.—Ansonia.....52c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent.
Iron, standard list assorted sizes, for large orders, 2c, card rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4·4c ₱ lb net
Iron Wedges.....4½c ₱ lb net
Norway Nail Rods.....9¼c ₱ lb net
Crow Bars (in ordering please state whether “Wedge” or “Pinch” point).....5c ₱ lb net
Beetle Rings.....8½c ₱ lb net
Fence Pickets—
⅝ round, bent to shape, 30c ₱ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts (new list).....70&10 % off net
Plow Bolts.....30, 10&5 % off net
Stove Bolts.....15 % off net
Machine and Square Head Bolts.....30&10 % off net
Coach and Lag Screws.....30&10 % off net
Bolt Ends.....35 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅝ in.....7½c ₱ lb off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to ⅞ in.....6 c ₱ lb off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅝ in.....9 c ₱ lb off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅛ in.....7 c ₱ lb off net
Nuts and Washers in 25 lb. boxes, 1c ₱ lb ex. Nuts and Washers in lots less than one keg each size, 1c ₱ lb ex. Nuts and Washers in 5 lb. boxes, 1½c. ₱ lb ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3¾c ₱ lb net; ⅞. ¾ in. diam. 3¾c ₱ lb net; ⅝ in. diam. 4c ₱ lb net.
Patent Headed Harrow Teeth, packed in casks, ¼c ₱ lb ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5¼c ₱ lb net; 9-16 in. diam. 6½c ₱ lb net; ½ in. diam. 7½c ₱ lb net. 1c ₱ lb extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¾ to 1 in. diam. 9c ₱ lb net; ⅝ in. diam. 10c ₱ lb net; ½ in. diam. 12 c ₱ lb net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 36 in. long, 5½c ₱ lb net; 8, 10 & 12 in. long, 6¾c ₱ lb net
Strap and T Hinges.....20 & 10 % off net, delivery as customary.
For purchases amounting to $250 between May 30th and December 31st, 5 % extra off.
Screw Hitching Rings.....$5 25 ₱ 100 net
Duck Nest Tuyere Irons.....$14 50 ₱ doz net
Cast Iron Washers.....₱ lb 4c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ lb 4 c net
1 to 2 in. diam. from 4 to 8 ft. long.....“ 4¼c net
1 to 2 in. diam. from 1¼ to 4 ft. long.....“ 4½c net
⅞, ¾ and ⅝ in. diam. over 4 ft. long.....“ 4¾c net
⅞, ¾ and ⅝ in. diam. from 1¼ to 4 ft. long “ 5¼c net.
Bridge bolts with upset ends.....¾c. ₱ lb extra
Wrought iron plates, punched.....5c. ₱ lb net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at Screw End,	₱ set of 8 bolts..	55c
12 “ ½ “ “	8 “ ..	70c
10 “ 9-16 “ “	8 “ .. }	
12 “ 9-16 “ “	8 “ .. }	90c
14 “ 9-16 “ “	8 “ .. }	$1 00
10 “ ⅝ “ “	8 “ .. }	
12 “ ⅝ “ “	8 “ .. }	1 00
14 “ ⅝ “ “	8 “ .. }	
16 “ ⅝ “ “	8 “ ..	1 10
		1 20

5c ₱ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....18c
“ “ wide track, each.....20c
Single Tree Irons, ₱ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....60c
“ “ 3 “ “.....65c
“ “ 3¼ “ “.....70c
“ “ 3½ “ “.....75c
Wagon Brake Ratchets, each.....16½c
“ “ finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
“ “ light “ each.....13½c
“ Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
“ “ “ “ 2, each.....10 c
“ “ “ “ 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 sets.....dis 25 %
Wagon Box Staples, 1¼ to 2¾ in. to clinch, ₱ 1000 $11 00 net
“ “ Bevel Box Iron, to rivet on, ₱ 1000 7 50 net
Neck Yoke Eyes, each.....4¼c net
“ “ with ⅜ rings, each.....7¼c net
King Bolts, ⅝, 1, 1¼, and 1¼ in. diam.....₱ lb 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths.....“ 8½c net
Wagon Rivets, 3-16 in. diam., all lengths.....“ 9½c net
“ “ & Nails, in 5 ₱ paper boxes....₱ lb 1c extra
“ “ in 25 ₱ wood “ “ ½c extra
Wagon and Hinge Nails, ¼ in.....₱ lb 17 c net
“ “ “ 3-16 in.....“ 19 c net
Double Tree Plates.....“ 8½c net
Coupling “.....“ 5½c net
Tongue “.....“ 9 c net
Neck Yoke Plates.....“ 11 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₱ lb as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₱ lb 10½c net. ¼ in., 11½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal

IC, 10x14.....	$12 00
IX, 10x14.....	14 75
XX, 10x14.....	17 50
IC, 12x12.....	13 50
IX, 12x12.....	15 25
IC, 14x20.....	13 00
IX, 14x20.....	15 75
XX, 14x20.....	18 50
XXX, 14x20.....	21 25
XXXX, 14x20.....	24 00
DC, 100 Plate.....	11 50
DX, “	14 25
DXX, “	17 00
DXXX “	19 75
DXXXX 100 Plate..	22 50
IX, 14x14.....	24 00
IC, 10x14 W.....	11 50
IX, 10x14 W.....	14 25

Roofing Tin.—Best Char.

IC, Terne, 14x20.....	$10 75
IX, “ 14x20.....	13 50
IC, Terne, 20x28.....	21 75
IX, “ 20x28.....	27 25

Coke Tin.—

IC, 10x14 Coke.....	$10 00
IX, 10x14, Coke	12 75
IC, 14x20, “	11 00

Sheet Zinc.—Any width.....9¾c
Copper.—Sheathing.....33c
Copper Bottoms.....34c
Planished Copper.—
Sheathing, 14x48.....41c
Boiler Size, No. 7.....43c
“ “ No. 8.....43c
“ “ No. 9.....43c
Tinning ₱ sheet, 14x48 10c
“ “ No. 7 10c
“ “ “ 8 14c
“ “ “ 9 16c
Pig Tin.—
Large Pigs.....29c
Small Pigs.....30c
Bars.....30c
Solder.—No. 1.....17c
No. 2.....16c
Bright Wire...dis 37½ %
Sheet Iron.—
No. 18 Am. Com.....4 80
No. 24 Am. Com.....5 00
Pat. Am. Russia “A,” Nos. 24, 25 & 26.....14½c
Russia, Nos. 9, 10, 11 & 12.19c
Pat. Planished Russia..c
Russia No. 9, 10, 11 & 12....c
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $6 10
“ 21 to 24..... 6 80
“ 25 & 26..... 6 50
“ 21 to 21 Charl.. 7 80
“ 25 & 26 “ .. 8 00

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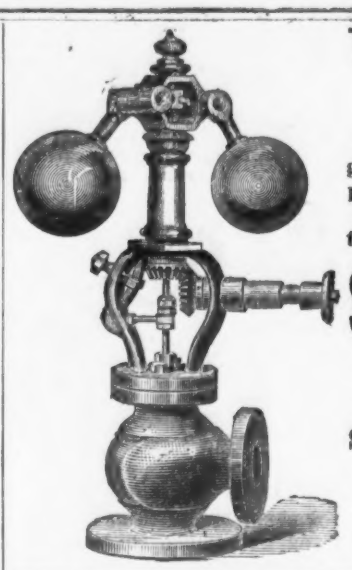

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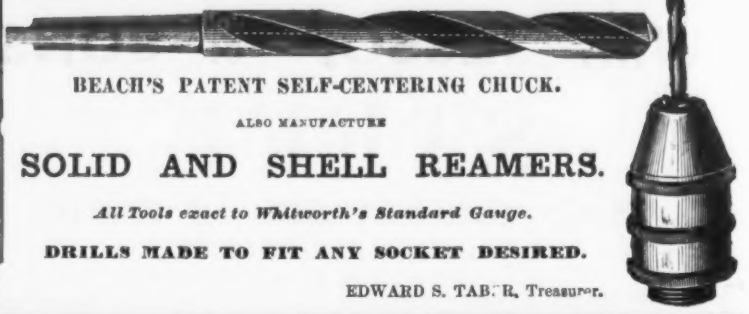
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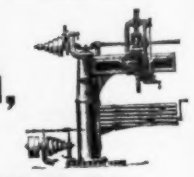
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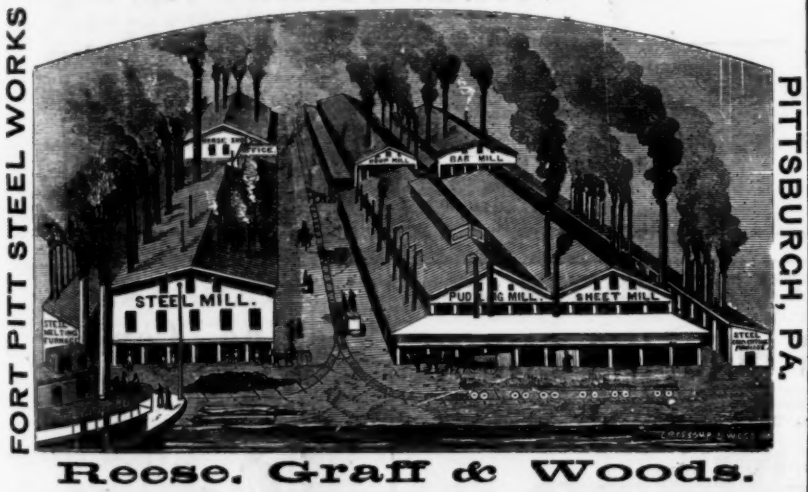

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THOMAS O. ENDERS, Sec'y Ætna Life Ins. Co.
LEVERETT BRAINARD, of Case, Lockwood & Brainard.
GEN. WM. B. FRANKLIN, Vice Pres't Colt's Pat. Fi Arms Mfg. Co.
AUSTIN DUNHAM, Pres't Willimantic Linen Co.
GEO. CROMPTON, Crompton Loom Works, Worcester.
EARL P. MASON, Pres't Prov. & Wor. R. R., Prov.
WILLIAM ADAMSON, of Baeder, Adamson & Co., Philadelphia.
WM. B. BEMENT, of Wm. B. Bement & Co., Ph'la.
S. P. M. TASKER, of Morris, Tasker & Co., Philadelphia.
C. W. FREELAND, Treas. Dwight Manufacturing Co., Boston.

THEO. H. BABCOCK, Manager.

New York Branch, No. 1 Park Place.

CHICAGO.

(Reported by Markley, Alling & Co.)

Agricultural Implements.—
Scythes—Dunn Edge Tool Co.....dis 30 %
Hay and Manure Forks—Otsego extra C. S.....dis 30 %
Hoes and Garden Rakes—Jackson and Otsego...dis 30 %
Scythe Stones.....dis 25 %
Scythe and Bush Snathes.....dis 25 %
Harvest Rakes and Barley Forks.....dis 25 %
Revolving Horse Rakes.....dis 25 %
Handles—Fork and Shovel.....dis 25 %
Cradles—Nithington, Cooley & Co.....dis 25 %
—Genuine Morgan.....₩ doz net $34 00

Augers and Bits.—
Ives' extra C. S....dis 30 % | Snell's.....dis 10 %
Jennings'.....dis 5 % | " Car Bits.....dis 10 %
Cook's.....dis 30 %

Axes.—Amoskeag Yankee.....₩ doz $12 00
Amoskeag Crescent..... " 13 00
Hunt's Bronzed..... " 12 00
Jefford's Silver Steel..... " 12 50
M. A. & Co. Clipper..... " 12 50
Mann's Red Warrior, Beveled..... " 12 50
" " Double Bit..... " 25 00
Handled Axes..... " 15 00
" " Boys..... " 12 00
Kennebeck..... " 11 00

Bolts.—Carriage and Tire.....dis 20 @ 10&5 %
Cast Barrel and Shutter.....dis 20&10 %
Wrought Iron Barrel.....add 10 %
" " Square.....net list

Butts.—Cast Fast Joint, Narrow.....dis 30 %
Cast Fast Joint, Broad.....dis 30 %
" Loose Joint.....dis 50&5 %
" " Pin, Reversible.....dis 40 %
" " Japanned.....dis 35 %
" " Silver Tipped.....dis 35 %
Wrought Narrow, Fast Joint.....dis 30 %
" Broad " " .....dis 30 %
" " Loose " .....dis 37 %
" Loose Pin.....dis 30 %
" Table.....dis 30 %
" Brass.....dis 10 %
Garretson's Blind Butts, Wood.....doz sets $1 75
" " " Brick.....doz sets 2 75
Parker's " Wood.....doz sets 1 85
" " Brick.....doz sets 2 75

Casters.—Iron Plate.....dis 25 %
Brass Wheel Plate.....dis 25 %
Porcelain Wheel Plate.....dis 25 %
" " Bed.....dis 25 %
Iron Wheel Bed.....dis 25 %

Chisels.—Butcher's Tanged Firmer.....dis 20 %
" Long Paring.....dis 30 %
Witherby Socket Framing.....dis 50&20 %
" " Firmer.....dis 50&20 %
" " Corner.....dis 50&20 %
" " Slicks.....dis 50&20 %

Coffee Mills.
Box 4 Iron.....$ 3 75 | Box 85 Cast Steel.....$12 00
" 103 " ..... 5 25 | Side 50..... 4 75
" 102 " ..... 6 25 | " 60..... 5 75
" 107 Britannia... 7 50 | " 70..... 7 25
" 106 " ..... 8 50 | " 90..... 10 00
" 25 Union..... 10 50 | " 15 Union..... 7 00
" 35 " ..... 12 00 | " 30 " 8 00
" 75 Cast Steel.. 10 50

Cutlery.—American Table.....dis 20 %
" Pocket.....dis 25 %

Door Springs.—Torry.....₩ doz $5 00
Rubber..... " 4 00
Boon's..... " 5 00

Drawing Knives.—Witherby Tool Co....dis 50&20 %
Ohio Tool Co.....net list

Files.—Butcher's.....$7 00 £
Nicholson's.....$5 00 @ $5 50 £

Hammers.—
Maydole's.....net list | Yerks & Plumb.....net list
| Cheney.....net list

Handles.
Extra Axe...₩ doz. $3 00 | Coal Pick, No. 1..₩ doz $2 00
No. 1 Axe.... " 2 25 | Sledge, No. 1.... " 2 00
No. 2 Axe.... " 2 00 | Hatchet..... " 65
R.R. Pick, No. 1 " 2 00 | Hammer, A. E.. " 65

Hatchets.—
| 1 | 2 | 3
Amoskeag Shingling.....$7 25 | $8 00 | $8 75
" Claw..... 7 75 | 8 50 | 9 22
" Lath..... 7 50 | 8 25 |
" Solid Steel..... 12 00

Hinges.—Strap and T.....dis 20& 10%
Screw Hook and Strap, 8 to 12 in.....8c. ₩ lb
" " 14 to 24 in.....6½c. ₩ lb
Hook and Eye Hinges.....net 12c. @ 16c. ₩ lb
Gate, No. 35, State.....₩ doz $3 50
" No. 3, In and Out..... " 3 50
" Blinn's Pat..... " 7 50

Hog Ringers.—Hill's Patent.....₩ doz $6 00
Hill's Patent Rings.....₩ 100, 25c
" Tongs.....₩ doz $5 00

Horse Nails.—Northwestern, 8d.....24c
Ausable, 8d.....24c
Globe, 8d.....26c

Kettles.—Brass.....54c

Locks and Knobs.—
Norwalk Lock Co. dis 45 % | Enameled.....dis 20&10 %
Branford " dis 45 % | EagleLock Co.....dis 15 %
| Am. Pad Locks.....dis 35 %
| Cont'al Lock Co. ..dis 10 %
| Woodruff Patent ...net list
| Stowe's Sausage Stuffers.....net list
| Enterprise Patent...dis 5 %

Molasses Gates.—
Stebbin's Patent ..dis 50 %

Nails.—10d to 60d.....per keg $4 00

Oil Stones.—Washita No. 1.....net 30c ₩ lb
Washita Slips.....net 60c "
Hindostan No. 1.....net 9c "
" Axe.....net 10c "
" Slips.....net 15c "

Picks and Mattocks.—Picks, Railroad,
Axe Finish.....₩ doz $12 00
Picks, Coal, Axe Finish..... " 10 00
Mattocks, L. C., Axe Finish..... " 15 00
" S. C., " " ..... " 14 50
Grub Hoes, Axe Finish, No. 2..... " 7 00

Planes.—Ohio Tool Co., Bench.....dis 35 %
Sciota.....dis 35 %
A. Howland & Co., Bench.....dis 30 %
" Fancy.....dis
Bailey Patent Iron.....dis 15 %
Plane Irons, Butcher's.....dis 30 %

Rivets.—Iron.dis 10 @ 15 % | Copper, No. 7 net, ₩ lb, 50c
Tinned.....dis 10 @ 15 %

Rules.—Stanley Rule and Level Co.....dis 50&10 %
Hubbard & Curtiss Mfg. Co.....dis 50&10 %

Sad Irons.—Best A No. 1.....₩ lb, 4c
" Copper Face Star.....₩ lb, 4½c

Sandpaper.
Baeder & Adamson's No. 0 to 1½...per ream, net $4 50
" No. 2 to 3..... " net 5 00
Wiggins & Stevens, No. 0 to 1½.....₩ ream, net, $4 50
" " No. 2 to 3..... " " 5 00

Sash Locks.—Champion.....₩ gross, net, $12 00
Hopkins & Dickinson.....dis 13 %
Judd's Patent.....dis 10 %
Corbin's Patent.....dis 10 %
Clark's Patent.....dis 20 %

Saws.—H. Disston & Sons.....dis 10 %
Champion X Cut.....₩ foot, net, 60c
M. A. & Co. X Cut..... " " 50c
Lightning Cut..... " " 66c

Screws.—American Screw Co.—Iron...new list dis 50 %
American Screw Co.—Brass.....dis 50 %

Shovels and Spades.
Ames' Black Shovels.....₩ doz $14 50
" Polished " ..... " 15 50
" Patent " ..... " 18 00
Ailing " ..... " 16 00
" " " Molders'..... " 18 00
Crane's Black " ..... " 11 50
" Polished " ..... " 12 00
Smith's " B. S. L. H. Rd. Pt..... " 13 50
" " " B. S. D. H. Rd. Pt..... " 14 00
Ames' Black Spades..... " 16 00
" Polished " ..... " 17 00
" Patent " ..... " 17 50
Ailing " ..... " 16 00
Crane's Black " ..... " 12 50
" Polish'd " ..... " 13 50

Scoops.—Ailing Steel Polished, No. 2.....₩ doz, $13 50
Ailing Steeled Polished, No. 3..... " 14 00
" " No. 4..... " 14 50
" " No. 5..... " 15 50
" " No. 6..... " 16 50
" " No. 7..... " 17 50
" " No. 8..... " 18 50
" " No. 10..... " 21 50
Crane's Polished, No. 5..... " 13 50
" No. 6..... " 14 50
" No. 7..... " 15 50
" No. 8..... " 16 50
Crane's Black Coal, No. 4..... " 17 50
" " No. 5..... " 18 00
Preston, Black Scoops No. 1..... " 12 00
" " No. 2..... " 12 50
" " No. 3..... " 13 00
" Half Pol. Scoops No. 1..... " 12 50
" " No. 2..... " 13 50
" " No. 3..... " 14 50
Lipptncott, Half Pol. No. 2..... " 15 00
" " No. 3..... " 16 00

Wrenches.—Taft's.....dis 60 %
Coe's Imitation.....dis 50 %
Coe's Genuine.....dis 35 %

Wringers.—Novelty Clothes Wringer.....₩ doz $65 00
Universal Clothes Wringer..... " 69 00

Chicago Metal Market.

(Reported by Cragin Bros. & Chandler, 141, 143, and 145 Lake St.)

Tin Plate.—
10x14, IC, Ch'l. Fair..$11 50 | 14x20, IX, Ch'l Best..$16 00
10x14, IC, " Best. 12 00 | 14x20, IXX, " " . 19 00
10x14 IX, " " . 15 00 | 14x20, IXXX, " " . 22 00
12x12, IC, " . 12 50 | DC, 100 Plate, " " . 12 00
12x12, IX, " " . 15 50 | DX, " " . 15 00
14x20, IC, " . 15 00 | DXX, " " . 18 00
Roofing IC, Charcoal, Best..... 11 50 | DXXX, " " . 21 00
Roofing IX, Charcoal " 14 50
10x14, IC, Coke " 11 00
20x28, Ic, Charcoal Roofing..... 23 00
20x28, IX, " 28 00
14x14, IX, Charcoal..... 25 00
10x20 Coke, for Gutters..... 18 00

Pig Tin.—
Large, 60 lb.....30c | Small, 30 lb.....31c
| Bar Tin.....32c

Zinc.—
In casks 1000 lbs..... c | In sheets..... 10¼c
" 500 " ..10 c | Slab..... 9¼c

Copper.—Copper Bottoms.....50c
Sheathing Copper.....34c
Planished Copper.....41c
" " cut to lengths.....45c

Braziers' Sheets, 30x60.—6 to 8 lbs.....41c
10 and 12 lbs.....38c

Solder.—Extra Fine, C. B. & Co.'s Brand.....25c
Fine, No. 1.....22c
Ordinary, No. 2.....20c
Plumbers' Solder.....23c
Braz'rs' or Spelt'r Solder.35c

Antimony......20c

Babbit Metal......15c @ 25c.

Galvanized Iron Conductor Pipe......₩ lb 10c

Sheet Iron.—

| Common. | Smooth. | Charcoal.
No. 14 to 24..... 5 c | 6½c | 7¼c
27 & 26..... 5½c | 6¾c | 7½c
27..... 5½c | 7 c | 7¾c

Add ¼c ₩ lb for 30 in. wide.

Galvanized Iron......new list

| | |
No. 16 to 20.....12c | No. 27.....15c
21 to 24.....13c | 28.....16c
25 & 26.....14c |

Russia Iron.— | No. 1 Stained.....19c
Perfect.....20c | In Sheets, 1c. higher.

American Russia.— | B.....12½c
A.....15c | In sheets, 1c higher.

Lead.— | Lead Pipe, in full coils .8¼c
Pig.....7½c | Lead Pipe, when cut..8½c
Bar.....8½c | Sheet Lead.....8¼c

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 156 to 161 Oliver St.)

Apple Parers.—Reading.....per doz $8 00

Augers.—Watrous Ship.....dis 10 %
L'Hommedieu Ship.....dis 15 %

Axes.—Forester's Favorite, Bronzed.....$12 50
Blue Jackets, Blue..... 12 00
Excelsior, Black..... 11 5
Chopper's Pride, Bronzed..... 11 00
Red Cross, Red..... 10 50
Red Cross, Handled..... 13 50
Boy's Handled Blue Jackets..... 12 00

Axe Handles.—Wadleigh's Oak—
A (Extra) $2 50. B (No. 1) $2 00. C (No. 2) $1 50 ₩ doz

Blind Hinges.—Washburn's.....per hundred set $9 50

Blind Fasts.—Washburn's.....per hundred set $5 75

Bolts.—Carriage. Phila.. " Girard Works.....dis 50&5 %

Borax.—Best Refined.....₩ lb 16c

Borers.—Angle, Backus'.....dis 50 %

Boring Machines.—Angle.....each $4 75
Common. Snell's quality.....each 3 75

Braces.—Barber's.....dis 40&5 %
Backus'.....dis 50 %
Spofford's.....dis 40 %

Brass Faucets.—L. F. & C.....dis 25 %

Butts.—Union Drilled Loose Joint.....dis 60 %
" " Wire Fast Joint.....dis 50 %
" " Acorn Loose Joint...dis 50&10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....dis 30 %
Wrought Narrow Butts.....dis 30 %

Cartridges.—" U. S. Cartridge Co."....dis 50 %

Chisels.—"Buck Bros.' Shank Goods...add 20 @ 22½ %
Socket".....add 22½ @ 25 %

Compasses and Dividers.—Bemis'.....dis 35 %
P. S. & W.....dis 25 %

Cordage.—Manila (usual trade dis.).....₩ lb, 16c
American Tarred Hemp Lath Yarn.....₩ lb, 10c

Corn Hooks......per doz $2 25

Crow Bars.—Iron. Steel Points.....₩ lb, 5½c
"Sweet" Steel Bars.....₩ lb 11c
Brown's Steel Bars.....₩ lb 10c
K. P. & Co. Extra Drill Steel.....₩ lb 15c

Dividers.—Cook's Nickel Plated.....dis 15 %

Door Springs.—Stimson's Patent.—
No. 7, Light Inside doors, $12 00.....dis 25 %
No. 8, " outside " $18 00.....dis 25 %
Torrey's.....$4 00

Emery.—Alden.....₩ lb 7c
Wellington Mills.....₩ lb 10c

Files.—Earl Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 10 %
Nicholson.....$5 to £ currency, less 1.½ %
" Regular Taper.....dis 12½&5 %
Stubb's Tapers, genuine, 8 in., $1 50; 3½, $1 62; 4, $1 88; 4½, $2 13; 5, $2 50.

Funnel Irons.—$2 50 | 2 50 | 2 50 | 3 25 per doz
5, | 5½, | 6, | 7 inch.
Deep Flange.—$3 50 | 3 75 | 4 00
5, | 5½, | 6 inch.

Hammers.—Maydole, new reduced list, July 1st, 1874.....dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $11; 1¾, $9 75. No. 1, bell face, No. 1, " " " " " " " " No. 1, " " " " " " " "

Hangers & Rollers.—Novelty.....dis 30 %
Anti-Friction.....$1 75 per pair—dis 30 %

Hatchets.—Underhill Edge Tool Co.....dis 10 %
Underhill pattern, solid, C. S. lathing.....$9 00
Underhill Bros. pattern, solid C. S. Lathing.....10 00
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4 75; 1, $5 25; 2, $5 75
Claw.....1, 5 75; 2, 6 25
Lathing.....1, $5 50
Axe Pattern.....1, $7 00; 2, 7 50
Broad....0, $5 75; 1, $6 50; 2, $7 50; 3, $9 25; 4, $10 75; 5, $12 75; 6, $14 75.

Hinges.—Strap and T, Stanley Works.....dis 20&10 %
Plate, Loose and Fast Joint.....₩ lb 7½c
Wrought Screw Hook.....₩ lb 8c

Hoes.—Ely Balch & Co. M., B. & D.'s list, 1874...dis 25 %
Remington, M., B. & D.'s list, 1874.....dis 30 %

Lead.—Sheet and Pipe.....7½c—less 10 %

Locks.—P. & F. Corbin.....new list dis 45&5 %
Nashua.....dis 45&5 %

Manure Forks.—
Myers & Ervien, M., B. & D.'s list, 1874.....dis 25 %
Peck, Clark & Co., " " .....dis 25 %
Shumway & Co., " " .....dis 30 %

Mattocks.—K. P. & Co.. axe finish. long cutter..$13 75
Short cutter..... 13 50

Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₩ lb

Nails.—10c and larger.....$4 00

Padlocks.—Wilcox.....dis 50&2 %
All Brass, 2¼ inch, 2 keys, job lot.....$9 00

Picks.—K. P. & Co., Polished Points—
5 to 6.....per doz $9 00; 6 to 7, $9 50

Pins.—Universal Hat and Coat—
All wood, 2 in.....₩ gross $2 50; 3 in., 3 50; 4 in., 4 50

Potato Digger.—
" Partridge," 6 square tine.....₩ doz $12 00
Shumway & Co., 6 round tine.....₩ doz 9 00

Pulleys.—Clark & Co.'s Axle, 2 in.....per doz 42c

Plated Ware.—Rogers Bros.....new list dis 40 %

Plumb & Levels.—" Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels.....dis 50 %
No. 2, First Quality Levels.....dis 60&10 %
No. 3, Iron Pocket " .....dis 35 %
No. 4, Level and Plumb Glasses.....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge.....dis 50&10 %
No. 6, Improved Iron Bench Planes.....dis 20&10 %

Pocket Knives.—Conn. Cutlery Co.....new net list

Rakes.—Cast Steel, garden.....dis 30 %
Malleable.....dis 25 %

Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c., dis 10 %

Rivets.—Black.....dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16c ₩ lb net

Sad Irons.—Bliss & Drake.....₩ lb 4½

Sand Paper.—0 to 2, $4 25; 2 to 3, $4 75..new list dis 10 %

Saws.—Disston's.....dis 12½ %
Lightning X cut, Boynton's.....per foot 6½c
" Saw Blades, 32 inch.....per doz $7 00
" Framed Saws.....per doz 8 50
Common " " .....per doz 6 00
Disston " " .....per doz 9 00
One man X cut.—Lightning.....$2 75 each
Disston's $3 00 each.....dis 12½ %
Wheeler, Madden & Clemson.....dis 15 %
" " " Mill.....dis 25 %
" " " Circular.....dis 25 %

Screws.—American Screw Co.....revised list dis 52½ %

Scythe Stones.—
"Willoughby Lake," first quality.....₩ gross $6 50
" second quality..... " 3 00

Shovels.—O. Ames.....new list dis 12½ %
M. B. & D.....new list dis 12½ %

Spading Forks.—M. & E.....dis 25 %

Stone Pickers.—"Partridge," original...₩ doz $15 00

Tools.—Aiken's Pattern, 20 in set; Miller's Falls, $12 00 per doz.....dis 15 %

Traps.—Oneida.....dis 30 %
Blake's.....dis 20&5 %

Vises.—K. P. & Co.'s Solid Box, Blacksmith...₩ lb 14½c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
"Howards." Parallel.....dis 20 %

Wardrobe Hooks.—Wire to drive.....₩ gross $1 00

Weights.—Window Weights.....₩ lb 2¾c

Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₩ ft 6c

Wrenches.—Genuine Wrenches, A. G. Coes..dis 40&5 %

Wringers.—
{ Novelty and Universal } Tub No. 2 .....per doz $67 00
Novelty Bench, No. 4.....per doz 104 00
Eureka.....per doz $60 00

Boston Metal Market.

(Corrected by Fuller, Dana & Fits.)

Tin Plates.—₩ box
I. C. Char. 10x14 @ $12 00
I. C. Coke 10x14.. 9 50
Char. Roof. IC, 14x20. 11 25
Coke " IC, 14x20, 10 25

Pig Tin.— ₩ lb
Banca.....30c
Straits.....26c
English.....24c

Zinc.—Sheet.....₩ lb 9¼c

Iron.—Sheet iron, Russia..... " 18c
Sheet Iron, English..... " 5 c
" " American Refined..... " 5¼c
" " Galvanized..... " 10c
Plate Iron..... " 4
Swedish and Norway Bar Iron, gold.....₩ ton, $122 50
" " " Shapes, gold..... " 130 00
Norway Nail Rods, first quality, gold..... " 145 00
" " second " " ..... " 135 00
Best Refined Bar Iron..... " 67 50
The "Burden Best" Iron..... " 108 00
American Pig Iron, Foundry, No. 1, x.... " 35 00
" " " No. 2, x.... " 33 00
Gray Forge..... " 30 00
Scotch Pig Iron.....₩ ton 37 00 @ 40 00
Wrought Scrap Iron..... " 35 00

Steel.—₩ lb
Eng. Tool..... 18c
American Tool..... 15c
" Mach..... 10¼c
Bessemer..... 7¼c

Copper.— ₩ lb
Sheathing..... 33c
Bolt..... 34c
Ingot..... 25c

Lead.— ₩ lb
Pig..... 7½c
Sheet and Pipe... 7¾c

Spelter......₩ lb 8c

Antimony......₩ lb 14c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co

Anvils.—Armitage.....₩ lb, gold 18c
Peter Wright's..... " 14c
Wilkinson's..... " 12½c

Apple Parers.—Conqueror.....₩ doz, $9 00
Lightning..... 9 00
Turn Table..... 9 00

Axes.—Hunt's.....₩ doz $13 00 @ 13 50
Lippincott's..... " 12 00 @ 13 00
Lippincott's Pioneer..... 13 00 @ 13 50
Simmons'..... " 12 00 @ 13 00

Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles.....new list net
Swelled Taper Axles.....new list net
Concord Axles.....new list net
Red Jacket Axles.....50&5 % off list net
Common Axles, 1½ inch and upward.....₩ lb 8½c
" " less than 1½ inch..... " 8½c

Bellows.—"Best St. Louis make" 60c ₩ in. dis 20 %

Bells.—Troy, Church.....₩ lb, 30c
Light Brass, Hand.....dis 50 %
Moore's, Cow.....dis 20 %

Bolts.—Arms, Bell & Co.'s Machine.....dis 20 %
Arms, Bell & Co.'s Carriage and Tire.....dis 25&5 %

Cast Butt Hinges.—Western Butt Co.'s—
Narrow Fast Joint.....dis 35 %
Broad Fast Joint.....dis 50 %
" Loose " .....dis 60 %
Reversible.....dis 50 %
" Japanned and Silver Tipped.....dis 45 %
Loose Joint "Acorn" " " .....dis 55 %
Lull & Porter's Blind.....dis 50 %

Wrought Butts.—Narrow.....dis 25 %
Reversible.....dis 30 %
Broad.....dis 30 %

Chain.—Eng. Coil..3-16 ¼ 5-16 ⅜ 7-16 ½ in.
15 11 10 9½ 9 8c gold
Trace.....6½ 10-2 5 c "
7 10-2 70c "
German Coil and Halter.....revised list add 10 %

Chisels.—Socket, Firmer or Framing.....dis 60 %

Clothes Wringers.—Crown.....₩ doz $60 00
Novelty..... " 69 00
Universal..... " 69 00
Monitor..... " 69 00

Corn Cutters or Hooks.—Solid Steel....₩ doz $4 50

Corn Knives.—Dunn E'ge T'ol Co.'s Clip..₩ doz $5 75
Disston's..... " 6 00

Crow Bars.—Steel Pointed.....₩ lb 7c

Cutlery.—J. Russell & Co.'s.....
Lamson, Goodnow & Co.'s..... } new list, dis 15 %
Landers, Frary & Clark's.....

Files and Rasps.—
Nicholson's Files.....$5 00 less 5 %
Butcher's Mill.....$8 75
Heller's & Bros Horse Rasps.....dis 40 %

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 50 %
" " Handled Hoes.....dis 30 %
" " Planter Eye Hoes.....add 15 %
Winsted's Planter Eye Hoes.....add 15 %

Hammers.—Yerkes & Plumb.....dis 5 %
Masons' Hammers.....₩ lb 30c
Smith Hand Hammers..... " 38c

Handles.—Axe.....Extra. $2 75 | No. 1. $2 25 | No. 2. $1 75 | No. 3 $1 00
Pick.....Extra. $2 50 | No. 1. $2 00 | No. 1½. $1 75 | No. 2 $1 25
Smith & Montross Fork, Hoe and Rake.....dis 20 %

Harrow Teeth.—1 inch iron.....₩ lb 4½c
⅞ and ¾ inch iron..... " 4¾c
⅝ inch iron..... " c
Barbed or Headed.....½c extra

Hatchets.—Hunt's.....dis 10 %
Simmons'.....dis 15 %

Hay Knives.—Lightning.....₩ doz $20 00
Dunn Edge Tool Co.'s.....₩ doz $14 50—dis 15 %
Fisher's..... " 16 50—dis 10 %

Hinges.—Strap and T—St. Louis make.....dis 25 %

Horse Nails.—Ausable.....22c rates
Northwestern..... 22c "
National Patent Pointed..... 21c "
" " " Extra Finished..... 22c "

Horse Shoes.—R. I. (Perkin's pat.).....₩ keg $6 5
Burden's..... " 6 50
Mule Shoes..... " 7 50
Rhode Island Trotting Shoes..... " 9 00

Lawn Mowers.—" Hill's Archimedean".....dis 20
" Excelsior".....dis 25 %
" Star".....dis 30 %

Locks and Latches.—
Jones & Nimick's.....revised list dis 40 %
Moorhead, Adams & Co.....revised list dis 40 %
Norwalk Lock Co.'s.....revised list dis 40 %

Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₩ doz. $14 75 @ 15 25
" Grub Hoes, Oval Eye....₩ doz. 10 75 @ 12 00

Nails.—Wheeling.....$3 75 rates
Orders for 100 kegs 10c ₩ keg less.

Picks.—Klein, Logan & Co.'s R. R. and Clay ₩ doz.$11 00
Klein, Logan & Co.'s Coal..... " 8 50
" " Poll..... "
" " Stone..... " 14 50
" " Tamping..... " 17 00

Planes.—Ohio Tool Co.'s.....dis 30 %
Sciota.....dis 40 %

Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 30 %
Barton's Patent.....₩ doz $35—dis 20 %
Vaughn's " .....25—dis 10 %

Sad Irons.—Monitor Brand, Silver Polished...₩ lb 4c

Sash Weights.—Standard Solid Eyes.....₩ lb 3¾c

Saws.—Disston's.....dis 10 %
Hubbard, Lippincott, B. & Co.'s.....dis 10 %
Branch, Crooks & Co.'s.....dis 15 %
Livingston's Patent Buck.....net list

Screws.—American Screw Co.'s revised list....dis 50 %

Scythes.—
Dunn Edge Tool Co.'s .....new list dis 25 %
Paris Furnace Co.'s.....dis 30 %

Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00
Extra Indian Pond..... " 7 50
Premium..... " 9 50
Diamond Grit..... " 13 50
} dis 25 %

Shovels, Spades and Scoops.—
Ames'.....dis 7½ %
Lippincott's.....dis 20 %
Rowland's Maxwell.....revised list dis 15 %

Sledges.—Smith a Stone or Coal Sledges—
Steel Face Polished.....₩ lb, 15c
Solid Cast Steel..... " 8c

Snaths and Cradles.—Seymour Mfg. Co.'s..dis 25 %

Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 20 %
Blue Seat Springs.....new list dis 15 %

Tacks.—Norway Tack Co.'s ½ weight.....dis 72½ %
Brads ½ weight.....dis 50 %

Thimble Skeins.—Pump & Skein Co.'s...dis 50&40 %

Traps.—Newhouse Patent.....dis 15 %

Vises.—Solid Box.....₩ lb 16c
Wilson Mfg. Co.'s.....dis 15 %

Wrenches.—Coes' Genuine.....dis 33½ %
Coes' Pattern.....dis 50 %
Taft's.....dis 60 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.

Tin Plate.
IC, 10x14, Charcoal...$12 00 | IC, continuous, 20 in. x 200 ft.....
IX, 10x14, " ... 15 00 | IX, continuous, 20 in. x 200 ft.....
IC, 12x12, " ... 12 50 | IC, 10x14, best Coke..$11 00
IX, 12x12, " ... 15 50 | IC, 10x14, good " .. 10 50
IC, 14x20, " ... 13 00 | IC, 10x20..... 17 50
IC, 14x20, Terne..... 11 50 | IX, 14x20.....
IX, 14x20, " ..... 14 00 | IC, 20x28.....
IC, 20x28, " ..... 23 00 | IX, 11x20, Coke Lead.
IX 20x28, Terne..... 28 00 | IX, 10x14, punch'd for Safes.....

Block Tin.
Large Pigs.....30c | Bars.....32c
Small " .....dic |

Sheet Zinc.
Casks.....₩ lb 10 c | Sheet.....₩ lb 11

Solder.
No. 1, Refined, in bars or plate.....$17 00
No. 2. " " " 18c
Pig Lead.....7¼c

Sheet Copper.—18 to 100 lbs. Sheets 30x60.....35c
14 to 16 lbs., Sheets 30x60.....35c
10 to 12 lbs., " and 20x72.....36c
6 to 9 lbs., " 41c
Tinned, 14 and 16 oz. 14x48.....34c
Planished, 14 and 16 oz. 14x48.....41c
" " No. 7, 8 and 9.....43c
Copper Bottoms.....37c

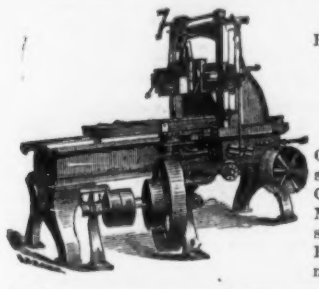
Sheet Iron.—

| Com'n. | Sm'th. | Char'l. | Jun'ia.
No. 16 to 20..... | 4½c | 5½c | 7¼c | 9¼c
No. 22 to 24..... | 4½c | 5½c | 7¼c | 9¼c
No. 26..... | 4¾c | 5¾c | 7½c | 9¾c
No. 27..... | 5 c | 6 c | 7¾c | 9¾c

Galvanized Iron......dis 20 %
Iron Rivets......dis 25&7½ %
Iron Wire......
Coppered Pail Bail Wire......
Copper Rivets and Burs......dis 25 %
Russia Iron.—Nos. 9, 10, 11 and 12. ₩ lb.....30c
No. 1 stained, ₩ lb.....19c
Imitation Russia, ₩ lb.....15c

The Pratt & Whitney Co.,

Hartford, Conn.,



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And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

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Portable Forges,

With or without Hood.

(Patented Nov. 25, 1873.)

WITHOUT BELTS OR BELLOWS.

It is more **Easily Worked**, gives a **Better Blast**, and is the **Cheapest** Forge made.

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N. Y. Depot for **Curry Combs, &c.**, with F. WIEBUSCH, 84 Chambers Street.

N. Y. Depot for **Forges**, with GEO. PLACE & CO., 121 Chambers & 103 Reade Streets.

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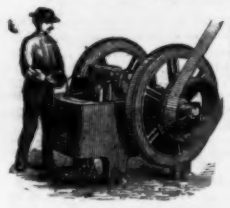
STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds o hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

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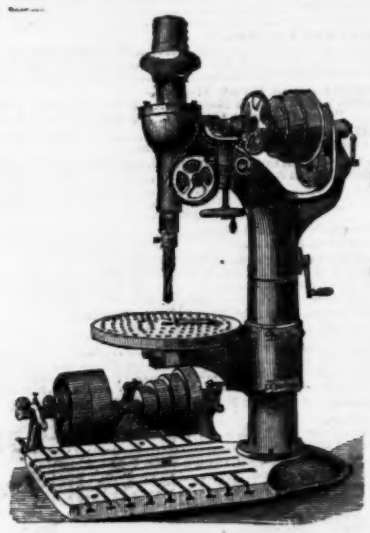

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From twelve (12) to forty-eight (48) inches swing;

Hand Lathes; Wood Turning Lathes; Vertical Drills; Boring Mills; Tapping and Centering Machines; Screw Press for Mandrels; **Grindstone Boxes.**

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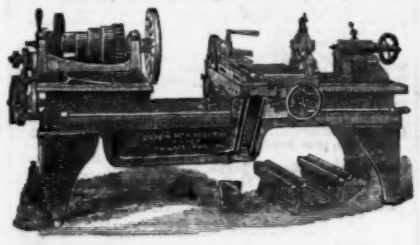

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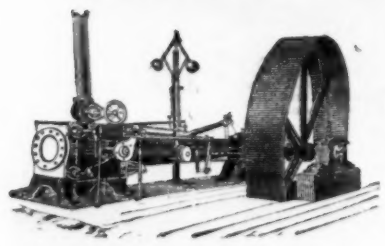

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Of all descriptions and for all purposes, of any proportion or size, for pumping Hot, Cold, Fresh, Salt, Muddy or Gritty Water, Grain-mash, Syrups, all kinds of Beer, Acids, Molasses, and all heavy and thick fluids. Also for Feeding Steam Boilers, Supplying Tanks, and for Sugar Refineries, Tanneries, Oil Refineries, Gas Works, Hotels, Breweries, and for all classes of manufactories: for Draining Mines and Excavations, and for Rolling Mills, Blast Furnaces and Water Works supplying Cities, Towns and Villages with Water; also, for Wrecking purposes and Steam Fire Engines for Land and Sea.

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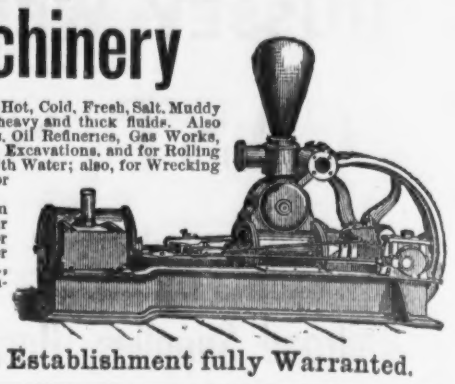

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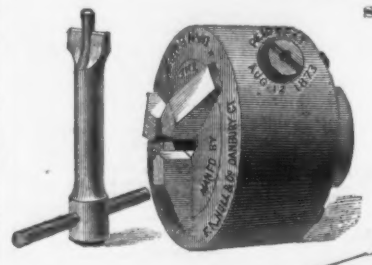

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Notequalled in any essential Only Chuck holding drills from ¼ down to 0. Runs *true* on all sizes, and will never slip or "set."

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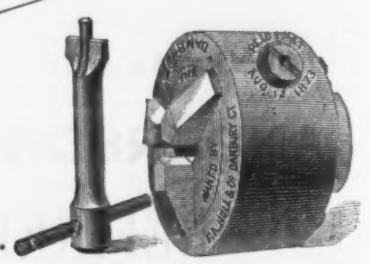

C. H. Reid's Patent, Aug. 12th, 1873.

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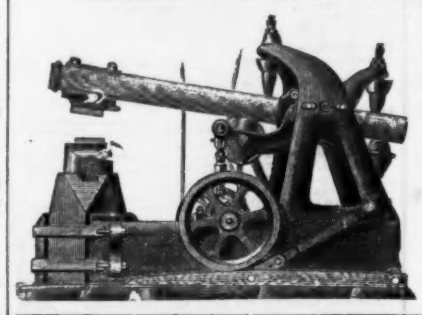

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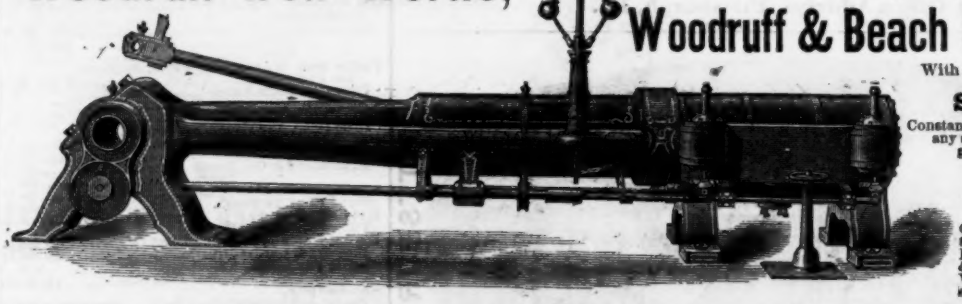

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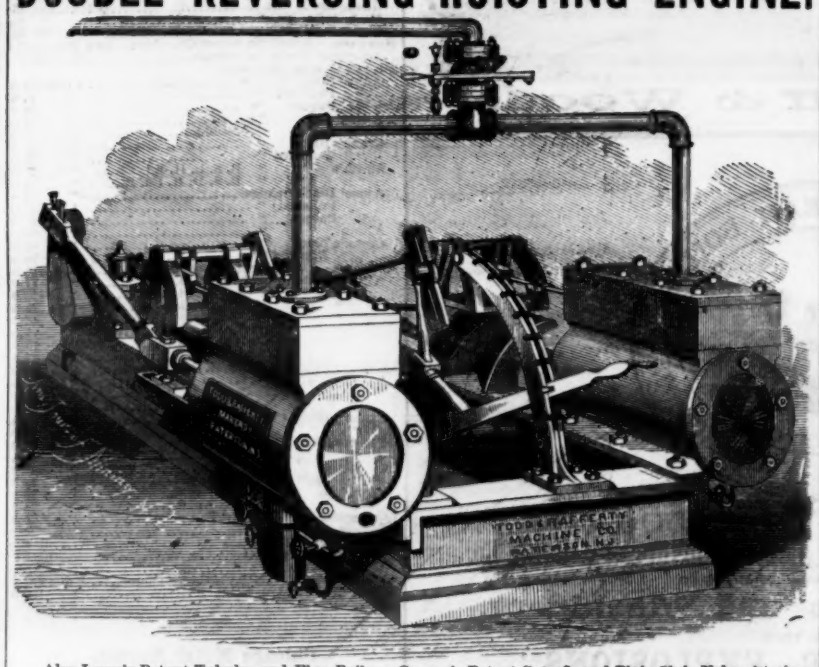

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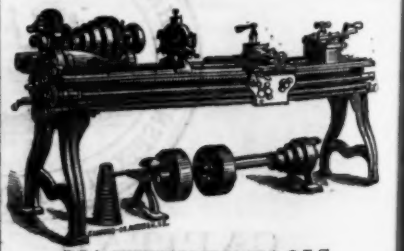

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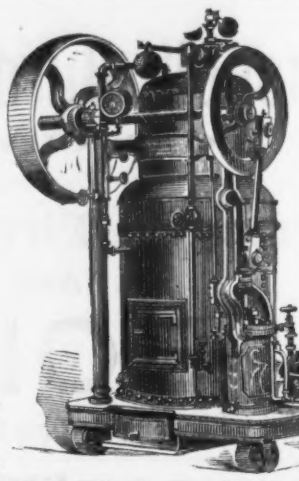

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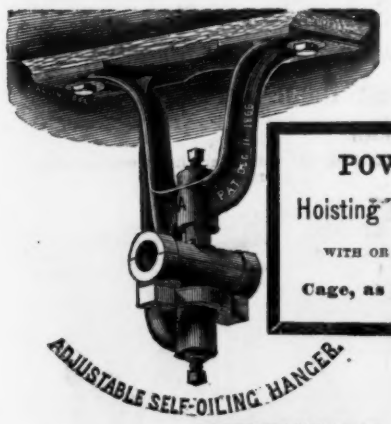

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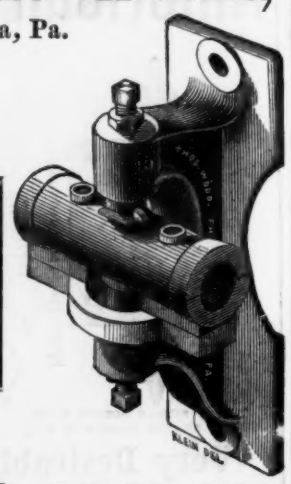

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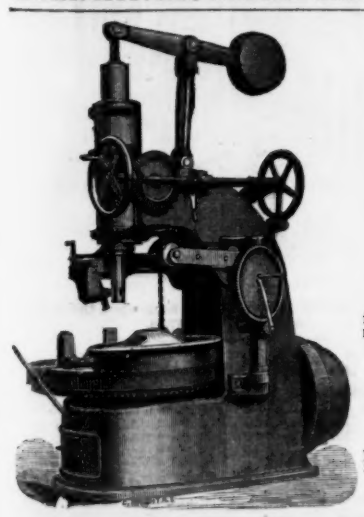

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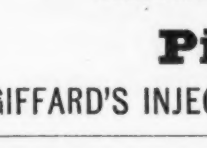

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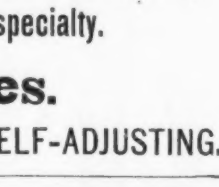

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Pulley Blocks,

Warranted superior to any made.

RATCHET DRILLS,

Machine Finished, Case Hardened and Interchangeable.

Self-Sustaining Rope Pulley Blocks

Being worked with a rope the motion is quick and steady, and in many cases is more suitable than the chain block. It is self-sustaining, the eccentric brake being put in or out of action by moving the hand-rope to the right or left, or by pulling the rope outward. The weight can be lowered or sustained at any desired point.

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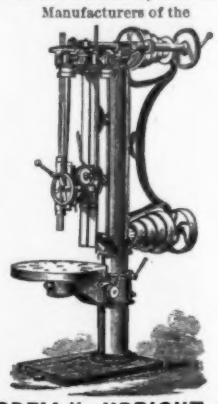

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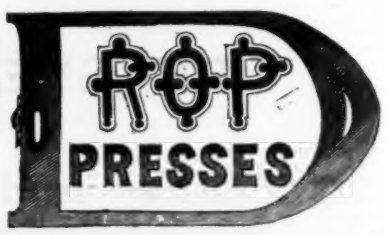

Bennett Hotchkiss and N. C. Stiles' Patent.

This Drop (which has been illustrated in this journal is of that class in which the Hammer is raised by a stiff belt or board passing up between two friction rolls, and is so well known that we will only describe our improvements. The patents we are working under are those of BENNETT HOTCHKISS (who in an interference case with Goulding and Cheney was declared the first inventor) and N. C. STILES. Our improvements consist:

First.—Of an arrangement of parts that makes it the most complete Jobbing Hammer, and will take the place, to a great extent, of all other kinds for forging. In addition to the upright rod, which is operated by the hammer to open and close the rolls, we place another rod the lower end of which is secured to the end of a lever which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a slot, so that the action of the hammer will not disturb the hand lever, thereby preventing the hand being injured, as otherwise would be the case.

Second.—No dog is used on the upright to hold up the hammer. The belt or board passes up between two clamps situated under the rolls, so arranged that as the hammer ascends they will freely open of themselves, but on descending they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressure upon the foot treadle.

Third.—The board or belt is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The back roll is made adjustable to different thicknesses of board or belt, as also are the clamps. An adjustable collar on the upright rod allows the operator to obtain *any hight* of blow desired automatically. If one blow is wanted, press upon the treadle and remove the pressure as soon as the blow is given. Keep the foot upon the treadle and the blows will be repeated until the pressure is removed. If a blow of less hight than the collar is set for is required, work the hand lever, which will give you any hight of blow desired. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired hight, so that the next blow can be given from a state of rest, of less hight than the collar is set for. This is a feature no other drop has; that is, the first blow struck can be of less hight than the second or third, and obtained from a state of rest. A gentle pressure upon the treadle will allow the hammer to go down slowly, but it will stop and remain suspended at any point as soon as the pressure is removed.

The clamps in holding up the hammer keep the boar from touching either roll and prevents the same from being worn uneven.

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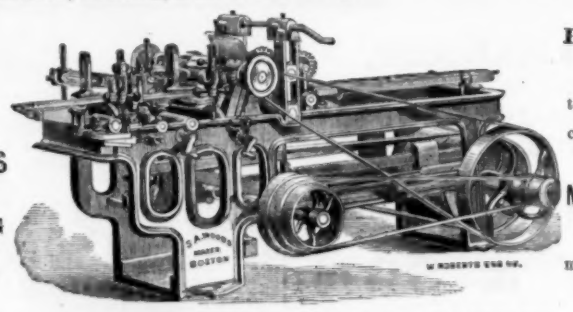

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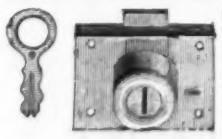

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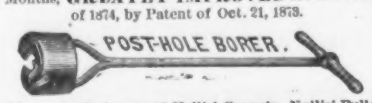

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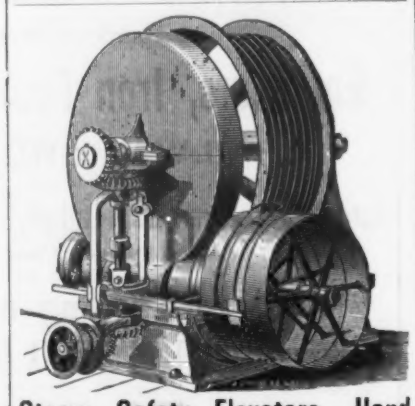

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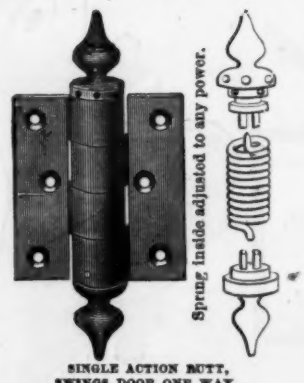

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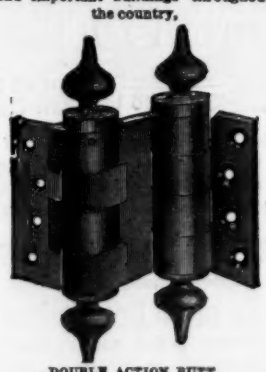

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